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JANUARY 1986
VOLUME 4
ISSUE 1

Apple II/Macintosh

THE INDEPENDENT GUIDE TO APPLE COMPUTING

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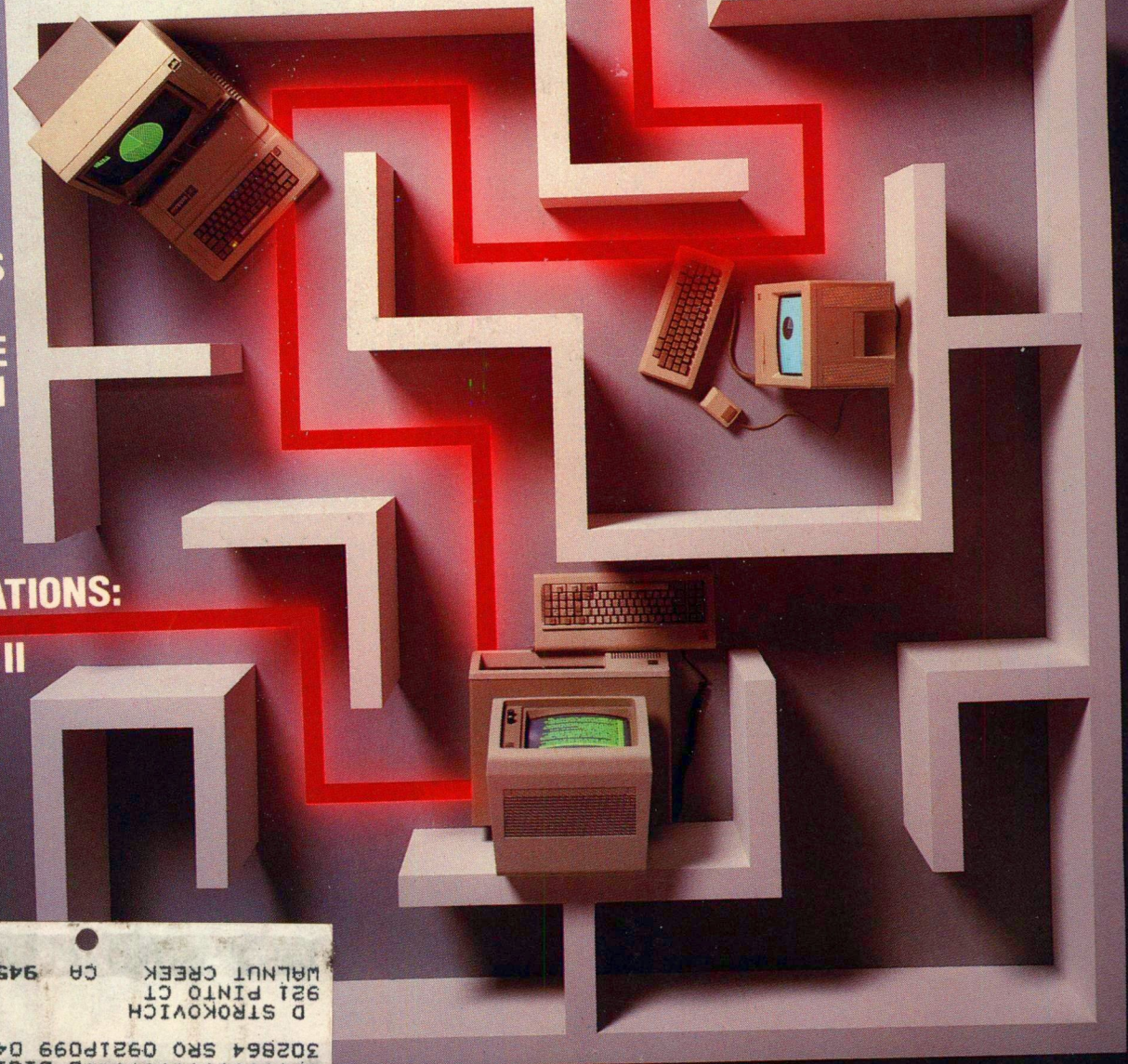

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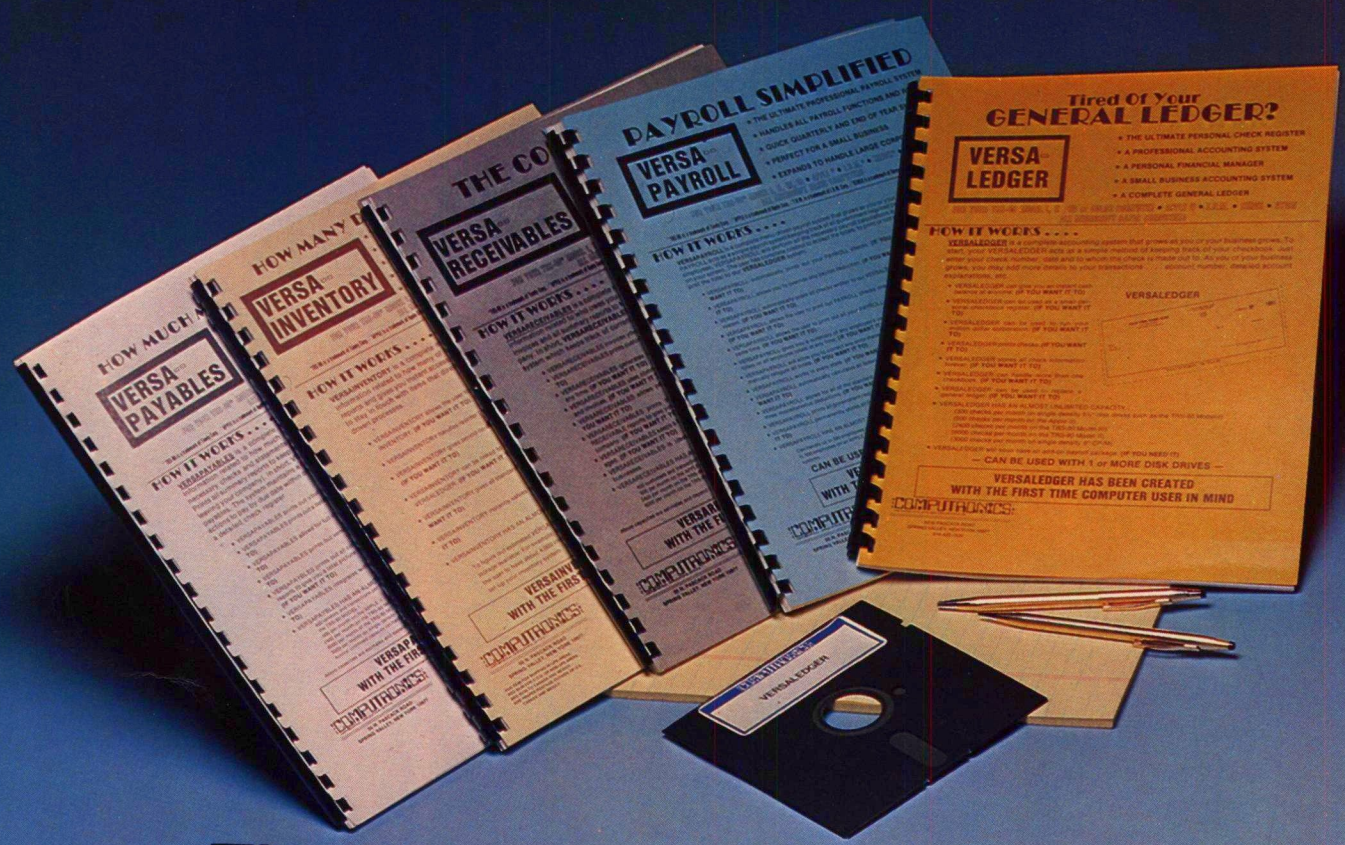

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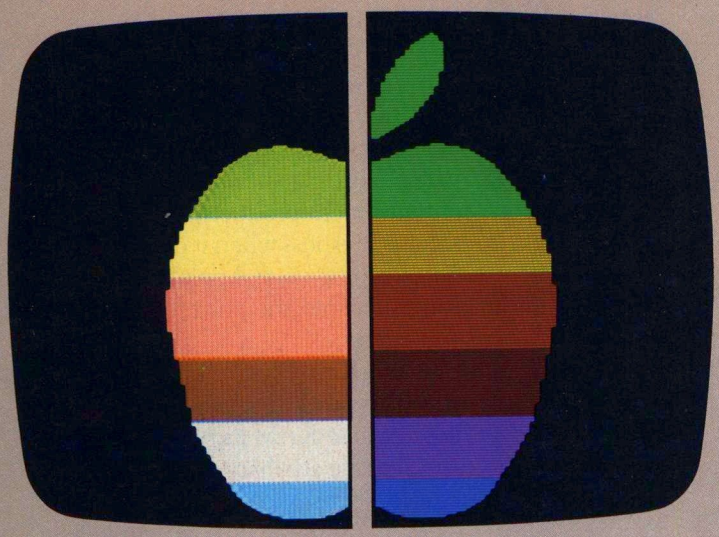

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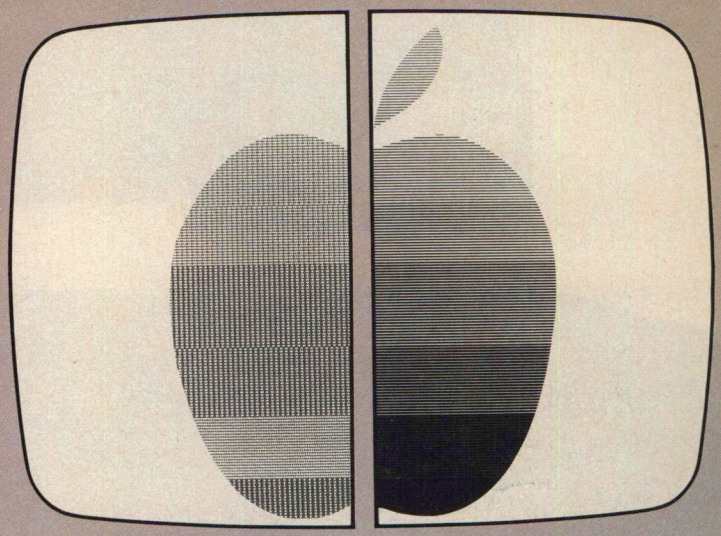

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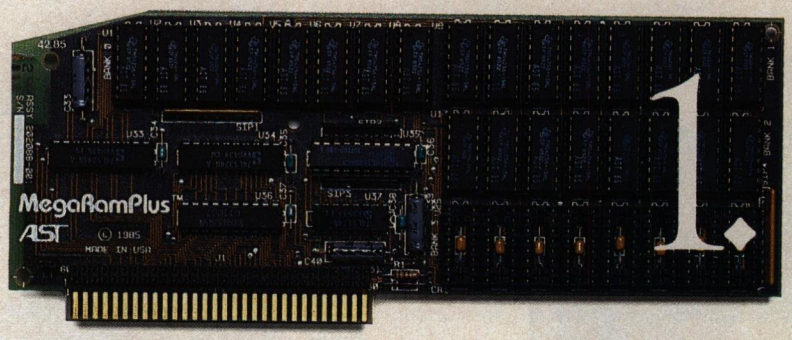

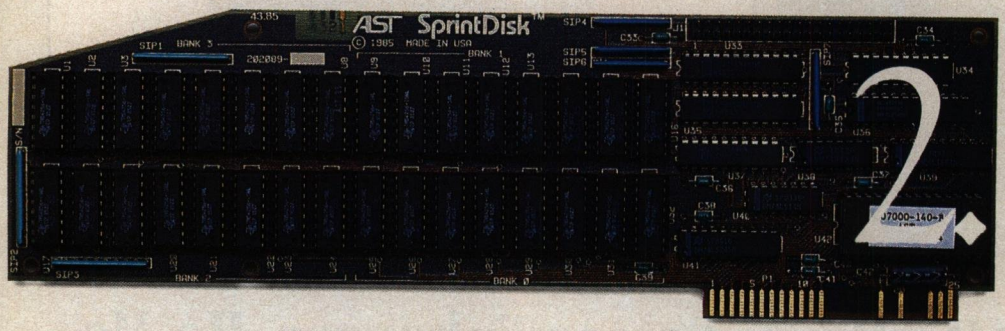

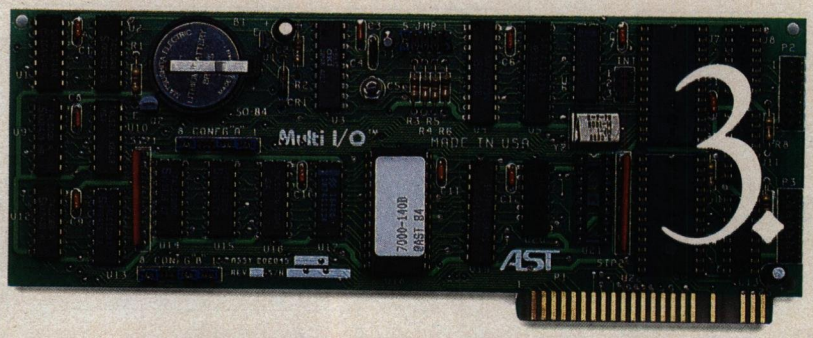

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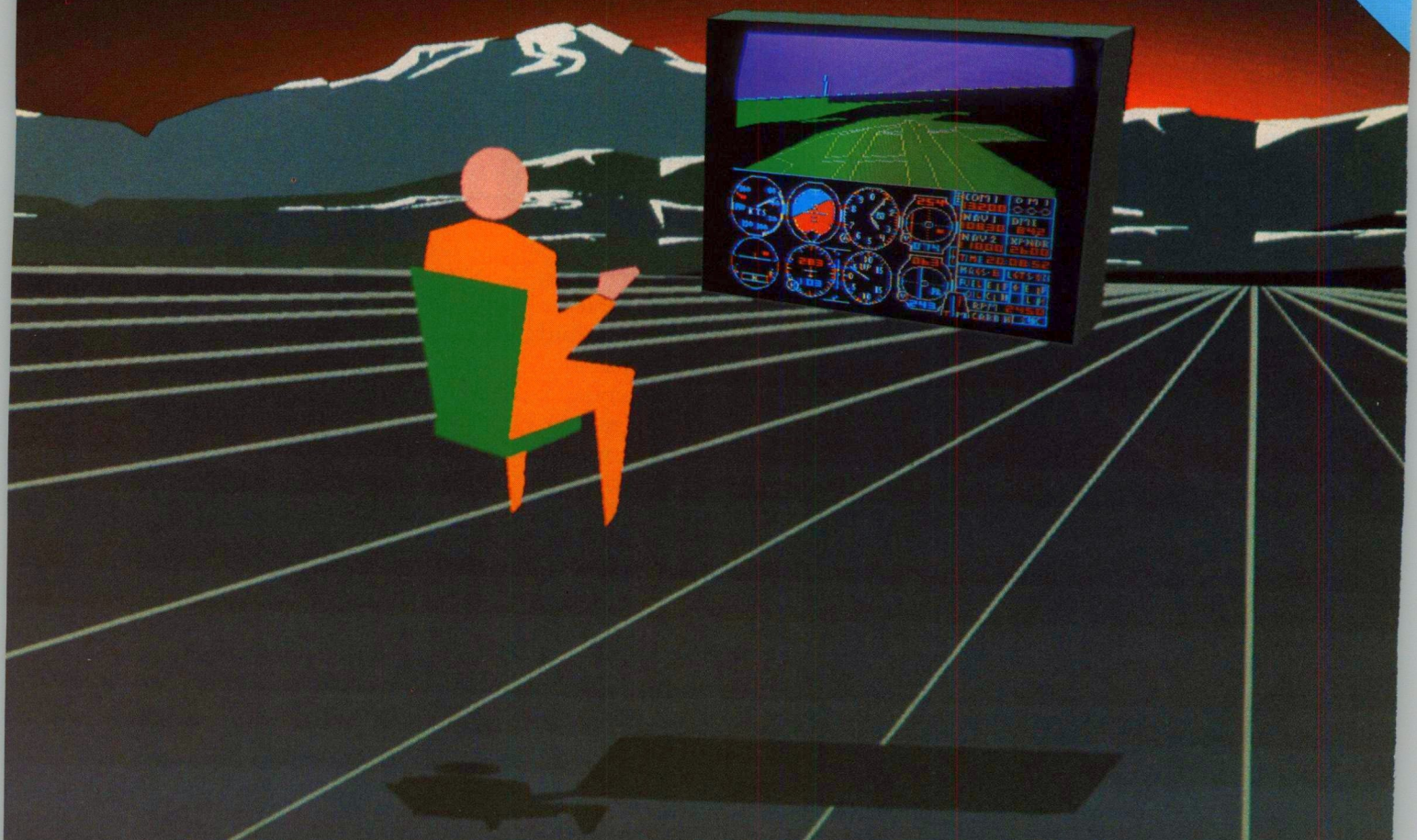

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Advertising/Business Office: Ziff-Davis Publishing Company, One Park Avenue, New York, NY 10016, (212) 503-5105
Subscription Inquiries and Service: A+, P.O. Box 2965, Boulder, CO 80322, (303) 447-9330

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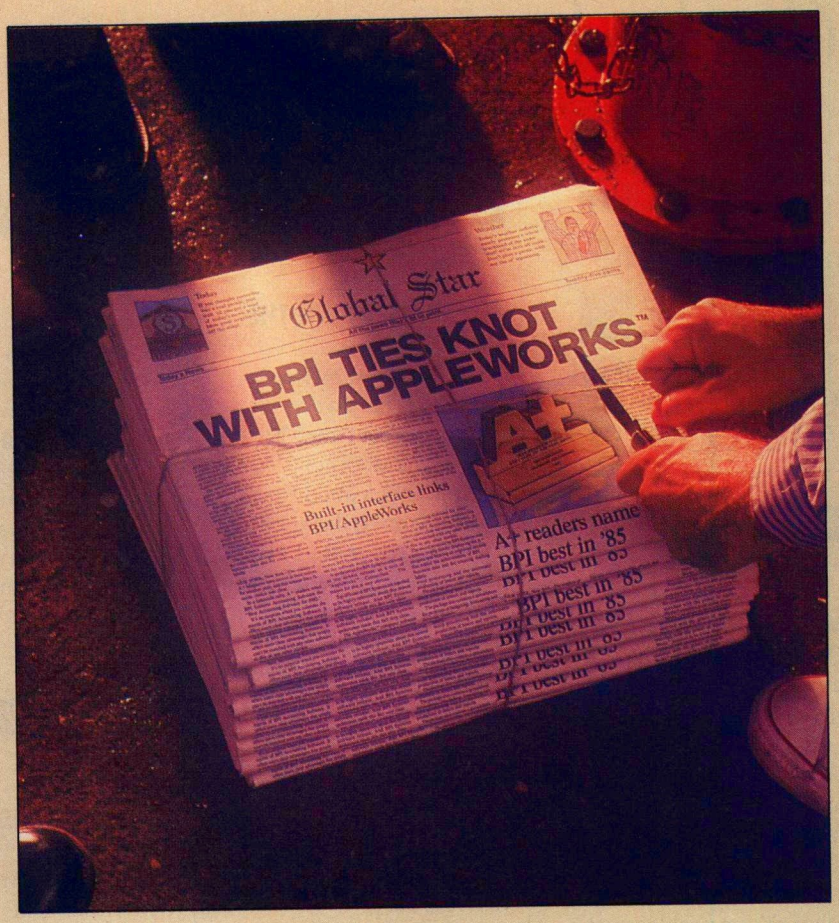

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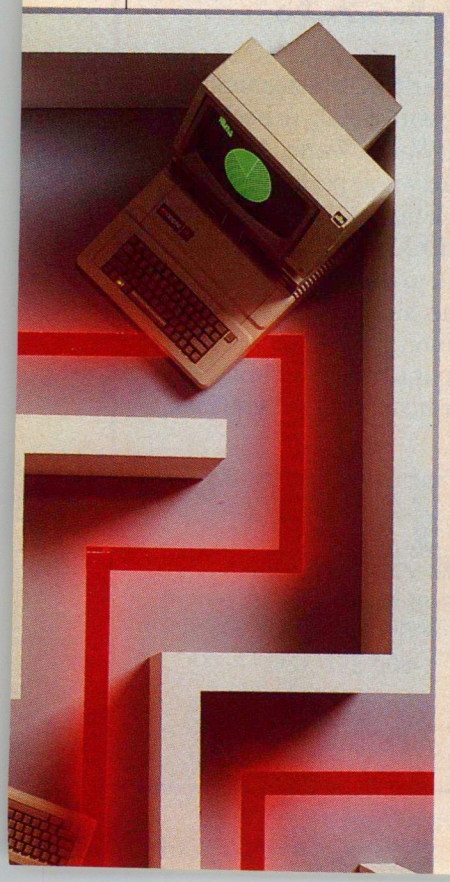

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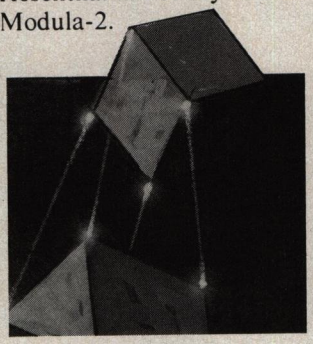

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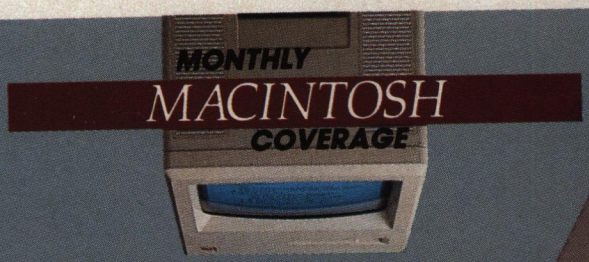

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The Display™

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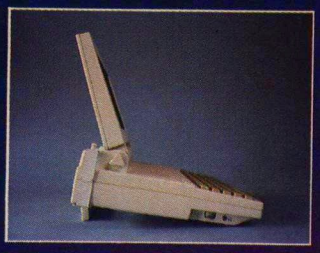

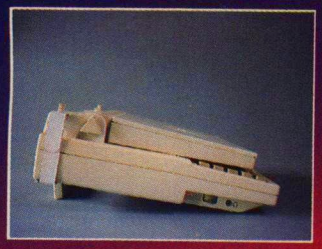

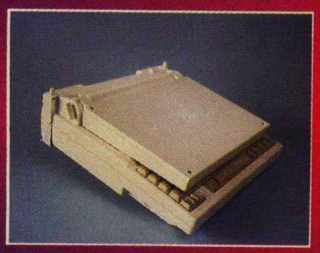

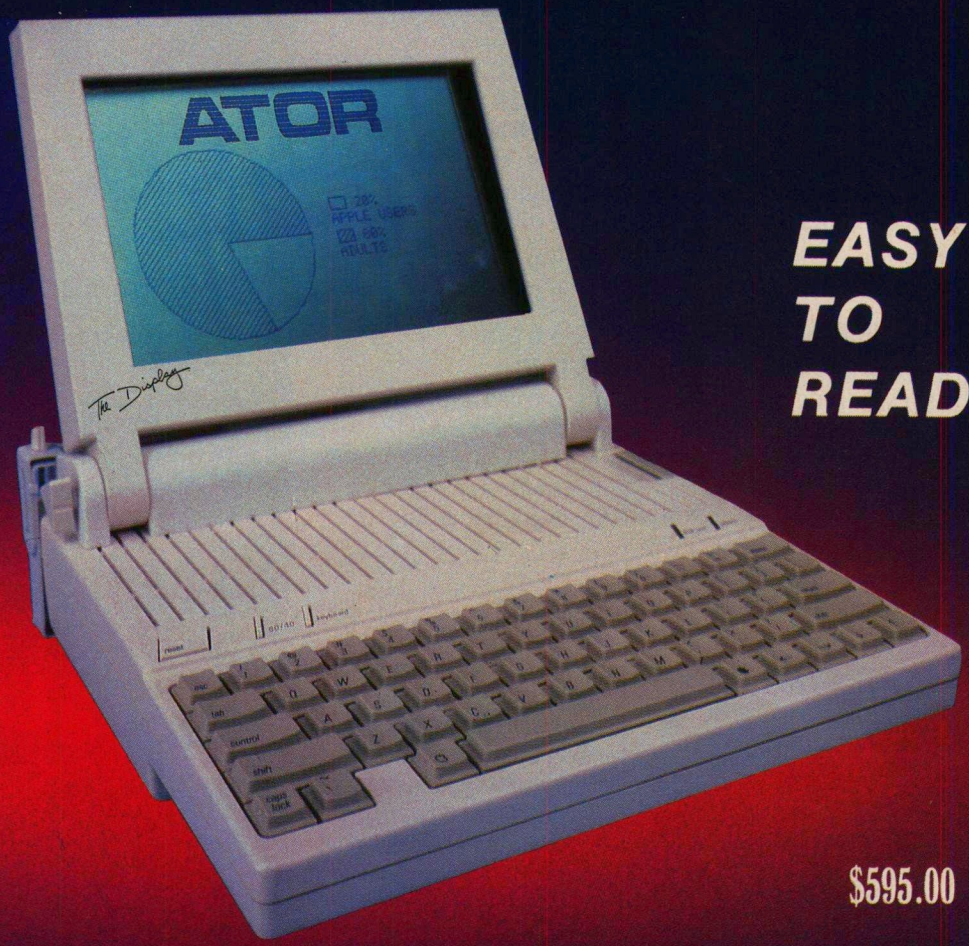

EASY TO READ

$595.00

- Same size as IIc monitor
- Same aspect ratio as IIc monitor
- Displays true graphic capabilities, circles look like circles
- Active viewing area 5⅜" x 8⅛"
- Offers best contrast and greatest viewing area of any flat panel for IIc
- Contrast and inverse video controls
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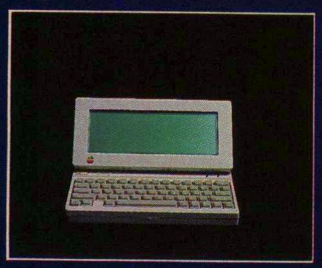
- Full 80 character by 24 line display, including graphics
- Compatible with all 32 Apple IIc graphic modes
- Folds down to protect IIc keyboard and display
- First LCD designed to go anywhere with the IIc, securely attached, yet easily removeable
- The panel fits safely and comfortably on IIc in the Apple IIc carrying case



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Ours

To order "The Display" for your Apple IIc, call ATOR 1-800-621-0854 ext 170.
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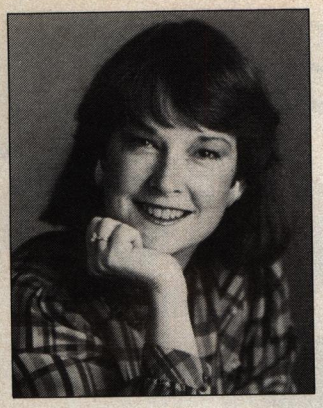


Message from Maggie

As technology moves ahead, we have better and better chances of creating products that not only make tasks easier and more efficient, but that also enrich our creative life.

HIGH TECH'S HALLMARK IS GROWTH AND CHANGE

Leaping from one advance to another, technology has grown and changed tremendously, just in the past year. The rate at which personal-computer memory capacity has increased truly amazes me. Not many years ago, 64K was a big deal. In the past year, standard memory configurations have doubled, and in 1986 you won't even be able to buy the basic Apple II configuration with less than 128K or the Mac with less than 512K. A megabyte or more of RAM may soon be common on both machines. Likewise with the central processor: 8-bit CPUs are becoming a thing of the past, and 32-bit may be displaced sooner than we think. These leaps and bounds don't surprise me, because the change is constant, just like a human being's first five years of life.

The same can be said for mass storage. Cassette tapes were the first Apple storage devices; they evolved into 140K floppy disks, and in 1986 the norm for the new 3.5-inch disks will be 800K. Five megabytes of hard-disk storage used to be expensive and bulky, but now you can get a 20-megabyte hard disk/power supply that replaces your Apple II power supply! 1986 will be the year of another mass-storage innovation, CD ROMs, optical-disk storage that will make a gigabyte of memory a reality.

Hardware won't be the only area to grow and change in 1986. Software will also be improving in performance and decreasing in price. You can definitely look for some interesting products in the artificial-intelligence category, as well as new versions of old favorites that have been updated to take advantage of hardware upgrades.

Just as with a child, the exciting part of all the innovation is the potential that it offers. As technology moves ahead, we have better and better chances of creating products that not only make tasks easier and more efficient, but that also enrich our creative lives.

At A+ our enthusiasm for technology is endless, and our contribution is to provide you with as much interesting and useful material as we can bring to you. Not only will we cover new technologies such as the storage devices and artificial-intelligence software I've mentioned, but we will also continue to cover the subjects you deal with daily: word processing, database management, financial analysis, accounting, telecommunications, graphics, and programming. Our goal is to provide information across the board for beginners to advanced users, with the heaviest concentration on intermediate-level users.

We also recognize that you don't use your computer for professional purposes alone. You use it for entertainment and education as well. Accordingly, we've expanded our "That's Entertainment" section to include a monthly column, Computer Calisthenics by Michael Wiesenberg, which lets you apply programming to puzzles.

Each new year makes us more aware of the humanistic aspects of computing as well. So, to start the new year off, we are proud to include in this issue one of several articles we will publish this year on disabled people using Apple computers to make a living.

We hope you enjoy our efforts this year, and don't forget to stay in touch. Look for details on the bulletin-board system we are setting up in the near future. +

Maggie Canon

MAGGIE CANON/**EDITOR IN CHIEF**

Let's compare Apples™ to Apples.™

An Apple IIc

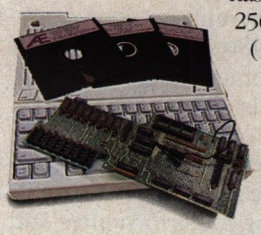
An Apple IIc with Z-RAM

The Apple IIc on the right works exactly the same as the Apple IIc on the left. Almost. The Apple on the right has a powerful memory expansion coprocessing card called Z-RAM. From Applied Engineering. Which means the Apple on the right can completely load AppleWorks into RAM—and then run it up to thirty times faster than the Apple on the left.

Z-RAM also acts as a solid-state disk drive. Which means the Apple on the right will load and store programs up to 30 times faster. And, our included RAM disk is compatible with Applesoft, PRO-DOS, DOS 3.3, PASCAL and CP/M.

Turbo Charged AppleWorks.

Even a 256K Z-RAM can completely load AppleWorks into RAM. With Z-RAM, the moment your fingers touch the keyboard AppleWorks responds. A 256K Z-RAM lets your IIc run AppleWorks up to 30 times faster, increases available desktop to 235K and maximum number of records from 1,350 to over 16,000, doubles the number of lines allowed in the word processor, provides a print spooler, and auto-segments large files so they can be saved on two or more disks. A 512K Z-RAM boosts AppleWorks desktop to an incredible 425K.



Take a closer look.

There's more. Z-RAM has a built-in high speed Z-80B microprocessor that allows you to run CP/M programs. Which means you now have access to the single largest body of software in existence, including popular packages like WordStar, dBase II, Turbo PASCAL and Microsoft BASIC. A 16 bit option is also available.

And still more. Z-RAM is compatible with all IIc software and hardware, installs easily in just ten minutes with a screwdriver (slightly longer without), is available with 256K or 512K of additional memory (a 256K Z-RAM can be upgraded to 512K at any time). Z-RAM is easily handled by the IIc power supply with our patent pending power saving design.

The only thing better than that would be a recommendation from Steve Wozniak.

> ***"I recommend Applied Engineering products wholeheartedly." (Of course, Steve's IIc has a Z-RAM installed.)***
>
> *Steve Wozniak, the creator of Apple Computer*

For fast response.

Z-RAM comes complete with simple instructions, RAM disk software, Z-80 operating system, CP/M manual. And a five year "hassle free" warranty. Make a good Apple great. With 256K Z-RAM "384K total" ($359); with 512K "640K total" ($419); 16 bit option may be added later ($89).

If you want to run CP/M software, but don't need more memory, we suggest our Z-80c card. The Z-80c has no memory expansion ports and is priced at only $159.

Call 214-241-6060 TO ORDER TODAY. 9 a.m. to 11 p.m. Seven days, or send check or money order to Applied Engineering. MasterCard, Visa and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 outside U.S.A.

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Letters

We invite your comments.

OBSOLESCENCE LOOMS

Dear A+: I noted with interest Mr. Ravich's comment in your October Letters to the Editor column on the lack of drivers for ProDOS with his Starfire disk. I do not have an answer for him but would like to comment on his predicament.

This kind of situation seems to be occurring more and more frequently and is something potential buyers of any add-on hardware product should carefully consider before making a purchase. Selecting a piece of hardware because of its price or because of a special feature it offers may be dooming your computer to obsolescence before its time. If this is acceptable, so be it, but it certainly is not something all the hardware manufacturers are anxious to bring to the consumer's attention.

Obsolescence is especially possible (likely?) when special software is involved. Most manufacturers consider such software as proprietary (and probably rightly so), which makes it impossible for the owner to even get a copy of it on the off chance that he might be able to modify it himself for future changes.

For myself, I now have two MicroSci A70 drives (original cost in excess of $1000) sitting in the garage, not even suitable as paperweights from my standpoint: MicroSci decided not to support Pascal 1.2 or ProDOS upgrades for them. My Mountain Computer hard disk (purchase price $2400) is also now headed down that path. Fortunately, Mountain Computer, Inc., did offer an upgrade for Pascal 1.2 (the system I use for 99% of my work) before stopping support, but it appears that if I ever want to use it for ProDOS or if Apple releases a new version of Pascal, I will be looking for more shelf space in the garage.

If it is any consolation, Mr. Ravich, you are not alone!

Clinton L. Collier
Walnut Creek, CA

EXEMPLARY COMPANY

Dear A+: I have been dealing with a wonderful software company for about a year now. I ordered a label-making program from Foxxivision and had some problems. They sent me an updated replacement disk with no questions asked, and when I made a suggestion to modify one of their programs to add another option, they sent me another disk with the suggested modification on it. I also appreciated the personal letters I received from the president of the company. This is a company that cares!

Foxxivision has games, graphics, and other programs. The company's new address is Foxxivision, Inc.; Suite 225, Muirwood Square; 35552 Grand River Avenue; Farmington Hills, MI 48024.

Barry Moskowitz
Culver City, CA

WRITE-PROTECTION OBSERVATIONS

Dear A+: I just finished installing the write-protection switch described in Jon vanWormer's article, "Positive Write Protection," in the October 1985 issue (pages 83–85).

I used an ARCHER illuminated SPST N.O. or N.C. Switch, sold by Radio Shack (cat. #275-678). The hookup instructions are the same as described in the article. I would like to point out a couple of differences I encountered while installing the switch.

First of all, in paragraph 10 of the instructions, the author says to use capacitor C-19 on the Apple drive for the 12-volt power source. I could not find a capacitor C-19, but I did find a capacitor C-5. I hooked up the leads to this one, and it works just fine.

In paragraph 11, we read that "the button should light up when it is in the out position and turn off when it is depressed." This is well and good, but paragraph 12 says, "When the button is in the in position, the light should be on and the disk should be write-protected," which is in direct contradiction to the preceding paragraph. (Mine works as stated in paragraph 11: When the button is pushed in, the light is off and the disk is not write-protected.)

Except for these three differences, I wish to commend Mr. vanWormer on a fine article that is very well written and extremely easy to follow. My thanks also to A+ for publishing a fine magazine.

Pete Hann
Newport News, VA

You're right. Paragraph 11 had the correct description of this project's results.

SUPPORT APPRECIATED

Dear A+: I must comment about a company that is so extraordinary, so helpful, so conscientious that it defies adequate description. Please let me explain. I have an Apple IIe with four disk drives. The main drives interfaced in slot 6 are two 3-inch Amdek drives using double-sided disks, on which I perform most of my work. The secondary drives, two 5¼-inch Apple Disk IIs, are interfaced in slot 5. All my backup and transfer work is handled by these drives. My reasons for using the Amdek disks are that I'm a clumsy, all-thumbs type of person, and these disks, with their hard cover, like the Macintosh disks, can take considerable abuse. I have to copy any programs purchased off the shelf from the 5¼-inch disks onto the 3-inch disks.

I recently purchased a well-documented, intriguing simulation program named GATO (see "That's Entertainment," December 1985). I booted the disk in slot 5, drive 1, and read on my monitor MUST BOOT IN SLOT 6!

I made many attempts to solve the problem: I ran COPYA from slot 5, drive 1 to slot 6, drive 2. Wrong. I copied but still didn't run. I tried Copy 2.+5.0. Nothing. I tried every method known. EDD 3.0, Nibbles, anything/everything—still nothing.

I recently purchased a well-documented, intriguing simulation program named GATO.

Then I changed interfaces, and it ran beautifully. When I switched back to the work interfaces, I gave up.

The next morning I called this commendable company, Spectrum HoloByte, Inc., Boulder, Colorado, to ask for help and was notified that the programmer, Joseph Yandrofski, was out to lunch. Would I please call back? (they gave me a WATS number to use). Imagine. So I called again after lunch and explained my situation. He told me of various things I could try while he attempted a solution there and said he'd call me back. Ha—I'd heard that before. Surprise! First thing next morning, Joe called and told me to try this and that. If it didn't work, I should let him know, and he would send me another version that could be copied on my equipment.

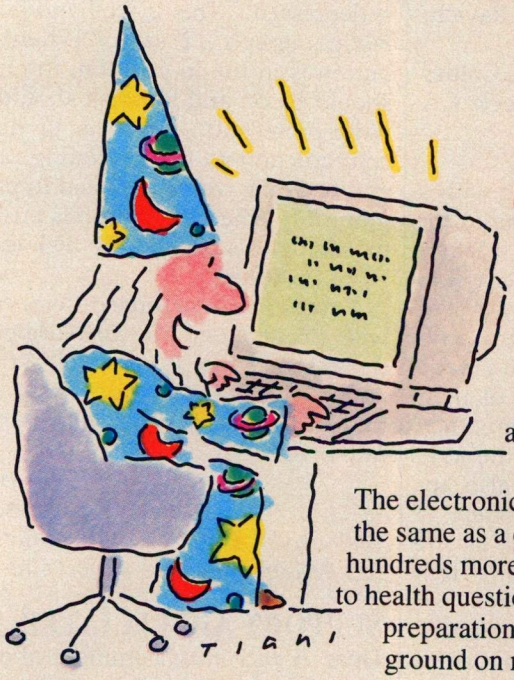
After many trials I still was not able to boot and run GATO, and I had to call back and bother him again. His secretary, Patricia Herringer, helped nearly as much as Joe by absorbing and passing on the information that I supplied.

What a bother I've been to them. And all the time they have spent trying to help me. For what? A $39.95 program? A Class 10 Operation out of Boulder, Colorado, for sure. I think they are remarkable.

Today, September 10, 1985, I received a mini-floppy disk mailer from Spectrum HoloByte, Inc. It works!

John Bolesny
Arlington, TX

Encyclopedia Electronica!



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CIRCLE 169 ON READER SERVICE CARD

NEWSROOM TIP

Dear *A+*: Users of Newsroom (*A+*, September 1985, pages 43–51) might be interested to know that, despite what the manual says, you don't need to initialize four disks—two is all you need. Use one to store photos, panels, and banners for any one newspaper (the program will differentiate for you when you call them up). Use the second disk as the page disk. If you have two drives, you won't have to do all the disk swapping that the reviewer objected to.

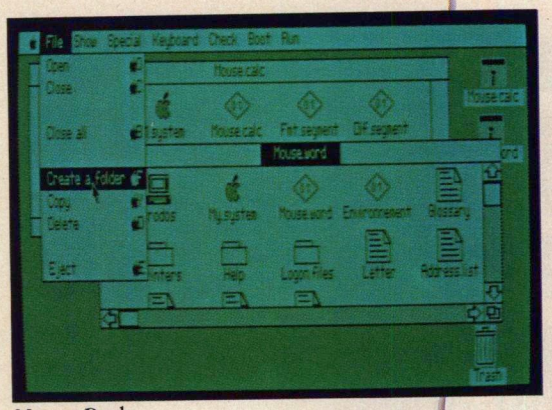
Also, the newer version of Newsroom has a two-speed cursor that really speeds things up. Updates are available for older versions for a small fee.

Joan Kraus
Rancho Palos Verdes, CA

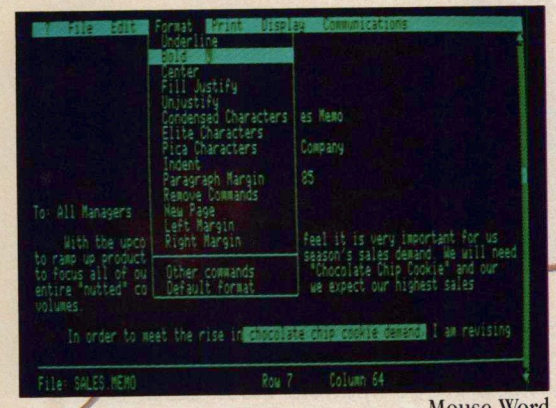
CORRECTION

In our November 1985 issue on page 214, we erroneously stated that you can use Sun Microsystems' The Bridge to print out a catalog list of files for PFS:Write. The Bridge actually lets you catalog a list of files only from PFS:File.

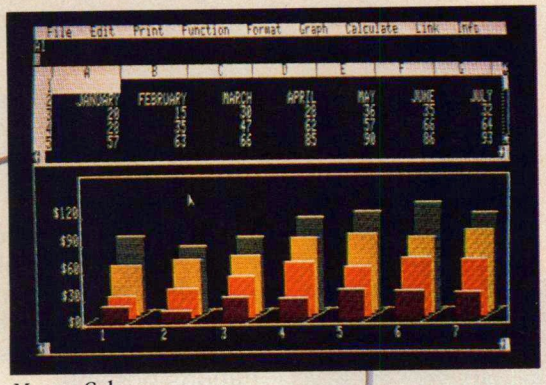
The Inside Line on the New Apple II



Mouse Desk



Mouse Word



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Mouse Series:™ the *first* line of software to take full advantage of all the recent advances on the Apple II.

Because it's mouse-based, the Mouse Series brings to the Apple II all the convenient features of the Macintosh™ – icons, windows, pull-down menus... Everything is just a point and click away.

How to Switch Programs... Without Switching Disks...

With Mouse Desk,™ changing programs is like using remote control on a T.V. Use the mouse to switch quickly from program to program, or copy and delete files visually, by "dragging" icons.

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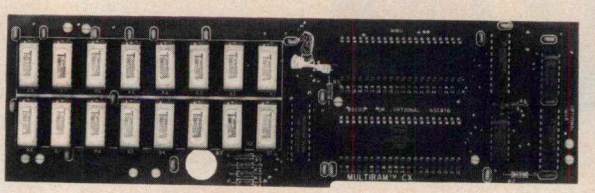
Put your expanded Apple to work immediately with an expanded AppleWorks program. Our software gives AppleWorks up to 425K Desktop in the //c and up to a 568K Desktop (1,137K with piggy back card) in the //e. Create databases with up to 5,350 records, 4,000 more records than normal. See the date and time on screen and automatically insert it into a database date field using any ProDOS compatible clock card. Speed up AppleWorks by loading all of the program into memory and never access the program disk again — not even for printing!



MultiRam™ CX

You can put a RAM disk into memory to use along with an expanded AppleWorks Desktop and switch between AppleWorks and programs on the RAM disk at lightning fast speed.

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...More *POWERFUL* Than an IBM

with speeds over 20 times faster than floppy drives. For those who want to add their own RAM, each card comes with a hi-res RAM test utility for easy RAM troubleshooting.

Programs like FlashCalc™, Magic Office™, SuperCalc3a™, Locksmith™ and other current programs will recognize MultiRam™ memory and others are being written or modified to do so.

MultiRam™ cards are designed to work with all hard disk drives, accelerator cards, the new Apple 800K UniDisk 3.5 drive, and other complementary hardware.

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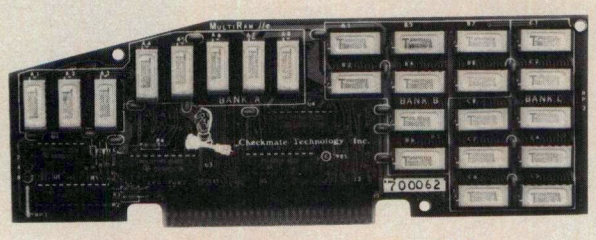
Shift your Apple into high gear with the optional 65C816 CX™ Kit for the //c or the MultiRam™ //EX Card for the //e. These MultiRam™ options bridge the gap between today's Apple and tomorrows promised Apple.

The 65C816 "X" options bring three unique benefits to your //c or //e: **(1)** Software for the 65C816 runs 4 or more times faster than existing Apple software, **(2)** 65C816 software is more powerful and easy to use as the 65C816 can directly address 16 megabytes of memory (both "X" options can use all added MultiRam™ memory), and **(3)** because the 65C816 works like a 65C02 until shifted into 16-bit mode, "X" options are 100% compatible with today's software.

Look for announcements of powerful new, 16 bit integrated software for the MultiRam™ family in Jan/Feb 1986 — software to rival or surpass the Mac and IBM!



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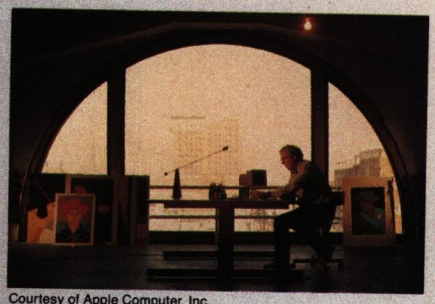

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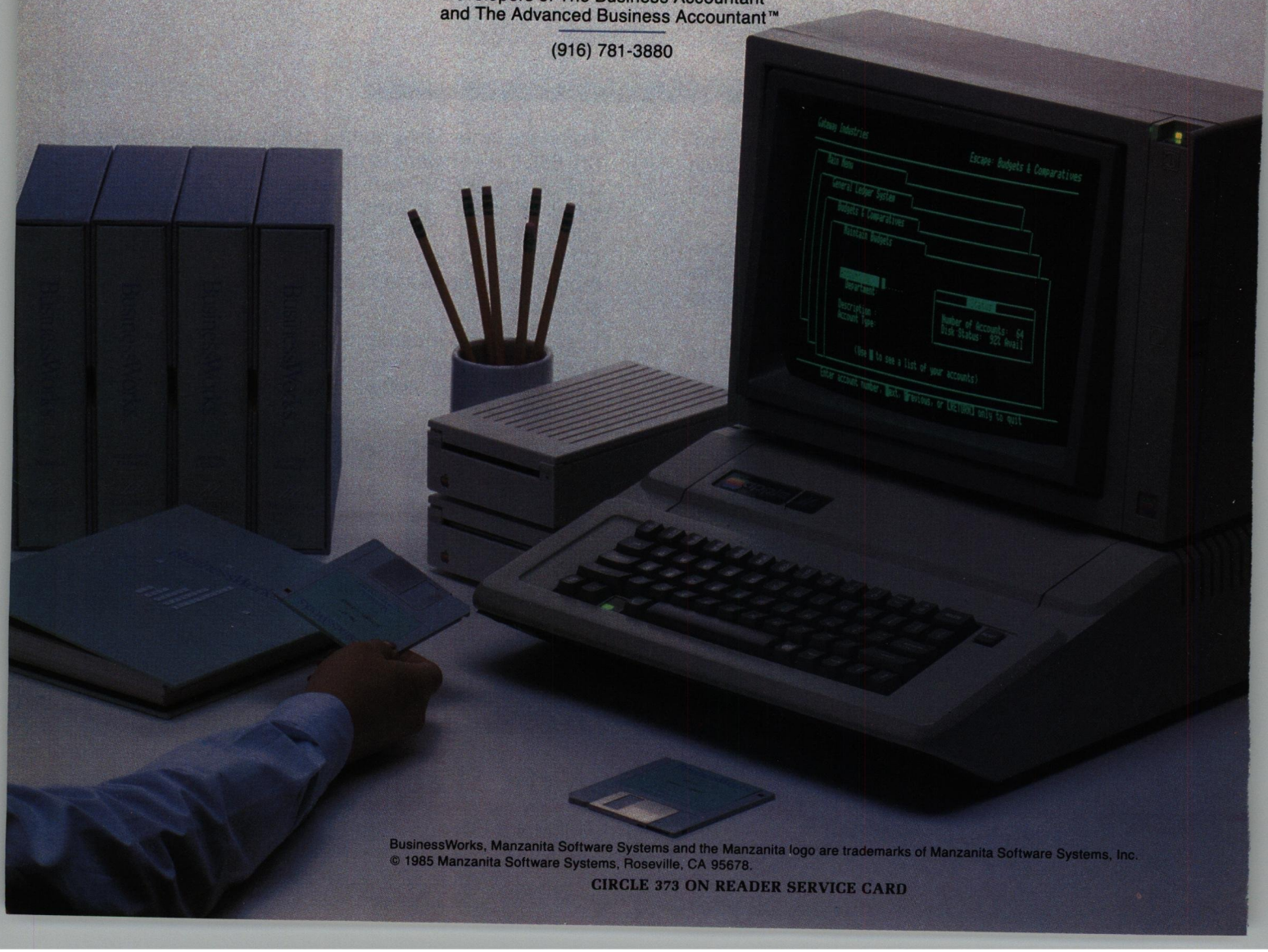

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CIRCLE 373 ON READER SERVICE CARD

BY FREDERIC E. DAVIS

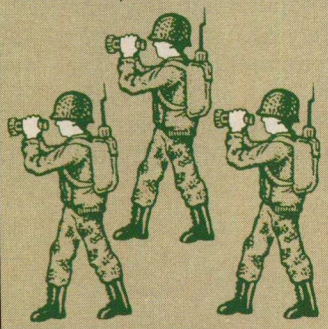
NewsPlus

Can two superpowers coexist without causing a nuclear holocaust?

PREVENTING NUCLEAR WAR

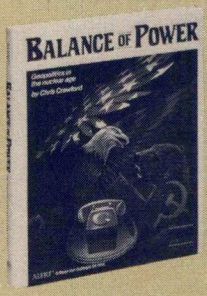
Can two superpowers coexist in a confrontational world without causing a nuclear holocaust? That's the question posed by two new educational games aimed at helping students learn conflict resolution and negotiation skills.

Tom Snyder Productions' The Other Side for the Apple II series seems best suited for actual classroom use, since it includes



a teachers' guide, students' guide, and other teaching aids. Another unique feature of The Other Side is that the game works with a modem, so that two players or teams using different computers at remote locations can play it. In fact, a group of junior-high and high-school students from the Boston area used a modem to play The Other Side with a group of similarly aged students at College de Leman in Geneva, Switzerland, during the U.S.-Soviet summit meeting last fall.

The other game is Mindscape's Balance of Power for the Macintosh.



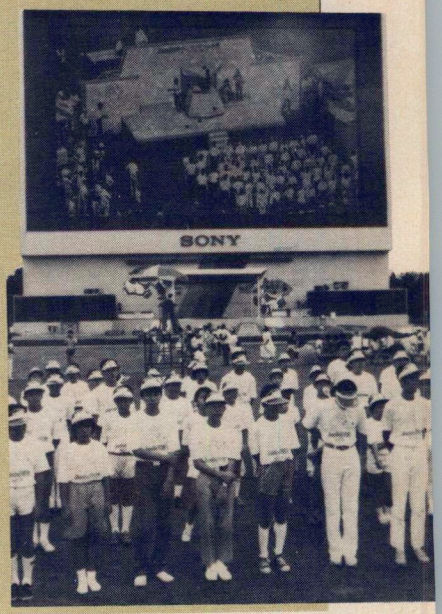
Balance of Power is a simulation game for one or two players who assume the roles of either the president of the United States or the general secretary of the Soviet Union. The two superpowers can negotiate with each other and with up to 62 other nations represented in the game. The goal of Balance of Power is to increase your country's prestige while avoiding nuclear war during an eight-year period.

These two games are a welcome alternative to the typical shoot-'em-up. I think it's a good sign to see war games whose object is to resolve conflict peacefully, rather than see if you can blow your opponent off the face of the planet.

WORLD'S LARGEST VIDEO GAME

Brøderbund's Lode Runner became the world's largest video game at last summer's World's Fair in Japan. Lode Runner, which has sold more than a million copies in Japan, was played by 50 contestants on Sony's Jumbotron video screen, whose display measures 80 feet tall by 150 feet wide.

The 50 contestants were selected from more than 3500 applicants from all over Japan; each player got three minutes to score as many points as possible. The winner of the contest was 12-year-old video-game whiz Yasutaka Fujii, who scored 12,750 points during the allotted time.



The 80386 is capable of performing 3 to 4 million instructions per second.

A+ ON-LINE WITH BRS AND MEAD

Information Access Company (one of A+'s sister companies) is making more of its on-line databases available to users of the BRS and Mead Data Central on-line services. The new databases include the Magazine Index, which indexes 400 periodicals (including A+); the Trade & Industry Index, which covers 400 business and trade publications; The National Newspaper Index; and the Legal Resource Index, which indexes more than 700 law reviews, legal newspapers, and bar-association journals. Previously these databases were available only through Dialog. The addition of BRS and Mead Data Central provides wider access to these databases.

NEW APPLEWORKS UPDATE

AppleWorks, Version 1.3, is the newest version of this best-selling integrated-software program. The most significant features of this version are that it works with the new UniDisk 3.5 and the Apple II Memory Expansion Board. Contact your dealer for information about how to receive an update.

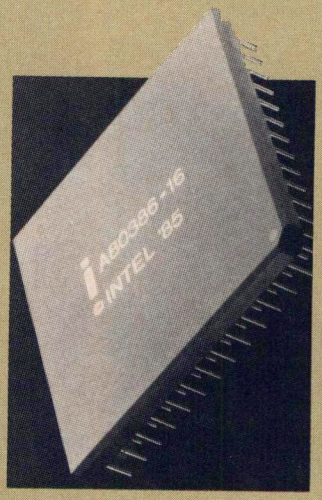


PHOTO COURTESY INTEL CORPORATION

CHIP CHAT

Intel made a big splash last fall with the introduction of its new 32-bit 80386 CPU chip, the latest evolution of the processor of the IBM PC series. Although IBM has not officially announced any plans to use the chip, IBM is generally expected to use the 80386 as the CPU in its next-generation IBM PC.

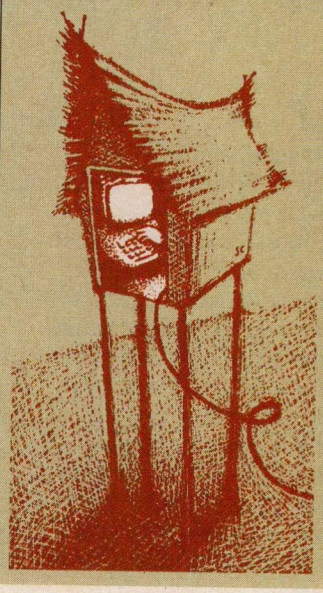
The 80386 is a real powerhouse, capable of performing 3 to 4 million instructions per second. The chip can directly address up to 4 gigabytes (4 billion bytes) of main memory and up to 64 terabytes (64 trillion bytes) of virtual memory and can run both MS-DOS and UNIX applications concurrently.

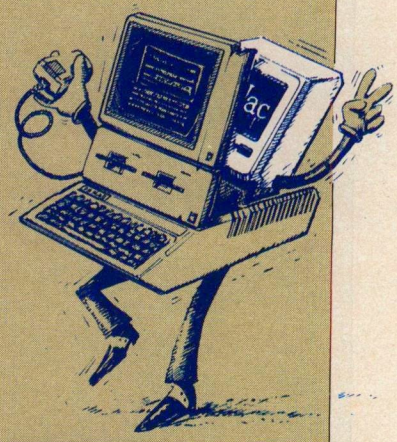
The 80386 is apparently better at running MS-DOS applications than is the 80286 chip currently in the IBM PC AT, so it will probably be used to create some high-powered PC-compatibles. My recommendation to third-party developers is to start drawing up plans for 80386 coprocessor boards for the Apple II and Mac in a real hurry.

PEACE CORPS GETS SITE LICENSE

The Peace Corps has received a small-scale site license to use Palantir's THE Word Processor on Apple IIe's at about 50 sites around the world. This agreement is one of the first instances of a site license for microcomputer software being awarded to an organization with fewer than 100 users.

Palantir is trying to woo site-license customers by letting organizations with as few as five computers take advantage of its offer. Low-cost site licenses are important to the microcomputer industry, since they help make microcomputer use more cost-effective and, under the right circumstances, less prone to software piracy.





MAC RUNS APPLE II PLUS SOFTWARE

Mac+II, Version 2.0, has recently been released by Meacom of Houston, Texas. This program turns your Mac into an Apple II Plus with 64K and operates under DOS 3.3, ProDOS, and Pascal 1.3. The program also allows the Mac to read the new 3.5-inch Apple II diskettes. Another version is in the works that emulates an Apple IIe. Contact Meacom at (713) 526-5706 for more information.

LASERWRITER FONT EDITOR

Altsys, the company that created the FONTastic ImageWriter font editor for the Mac, has a new product in the works called FONTographer that allows you to create and edit PostScript fonts for the LaserWriter. We'll be taking a look at this product in an upcoming issue of A+.

Want More AppleWorks™ Power?

You could put an Apple™ 1 meg memory expansion card in slot 4 and add another Apple 1 meg memory expansion card in slot 5 (Apple's card only expands to 1 meg). You'll need a separate 80 column card for the auxiliary slot. Oh, and put a printer buffer card in slot 2. If you want RGB color, you'll need an RGB board in slot 7 then buy a hard disk (if you have any slots left).

You'll have a bigger AppleWorks desktop, but you'll still be limited to a maximum of 1350 records in the data base. And you're stuck at 2250 lines in the word processor. And AppleWorks won't automatically load itself into memory, and make sure you don't create a file bigger than your disks can hold because Apple's memory card won't segment a file onto multiple disks.

Or
You could get RamWorks II®!

You'll have a bigger desktop.

You'll also have up to 16,300 records (not 1350) in the data base and up to 16,300 lines in the word processor (not 2250). AppleWorks will now automatically load into RAM. And if you create a file greater than your disk capacity, no problem. RamWorks II will automatically save it on multiple disks. And because of our built-in printer buffer, you can continue to use AppleWorks while your printer is printing. Nice. RamWorks II has an RGB option, 16 bit option and is expandable to 3 megabytes. And don't forget, RamWorks II is the software industry standard for memory expansion in the IIe. RamWorks II is automatically recognized by virtually all memory intensive programs (and many more are on the way) and is 100% compatible with all IIe software. So save your money and save your slots for other peripherals. Order RamWorks II today! Want more info? Just turn the page.

	RamWorks II®	Apple's™ Card
Maximum Desktop	2277K	1012K
Maximum Number of Records in Database	16,300	1350
Maximum Number of Lines in Word Processor	16,300	2250
Autoloads AppleWorks	YES	NO
Auto Segments Files	YES	NO
Built-in Printer Buffer	YES	NO
Compatible With All Versions of AppleWorks	YES	NO
Displays Time & Date on AppleWorks Screen with Clock	YES	NO
Saves Slots	YES	NO
RGB Option	YES	NO
16 Bit Co-Processor Port	YES	NO
Memory Expansion Port	YES	NO
Patent Pending Power-Saving Circuit	YES	NO
80 Columns Built-in	YES	NO
CP/M RAM Disk	YES	NO
Compatible with Franklin 2000 Software	YES	NO
Maximum Total Functions	6	1
Software Standard	YES	YES
Manufactured in	America	Singapore
Warranty	5 years	90 days
Price with 256K	$219	$249 est.

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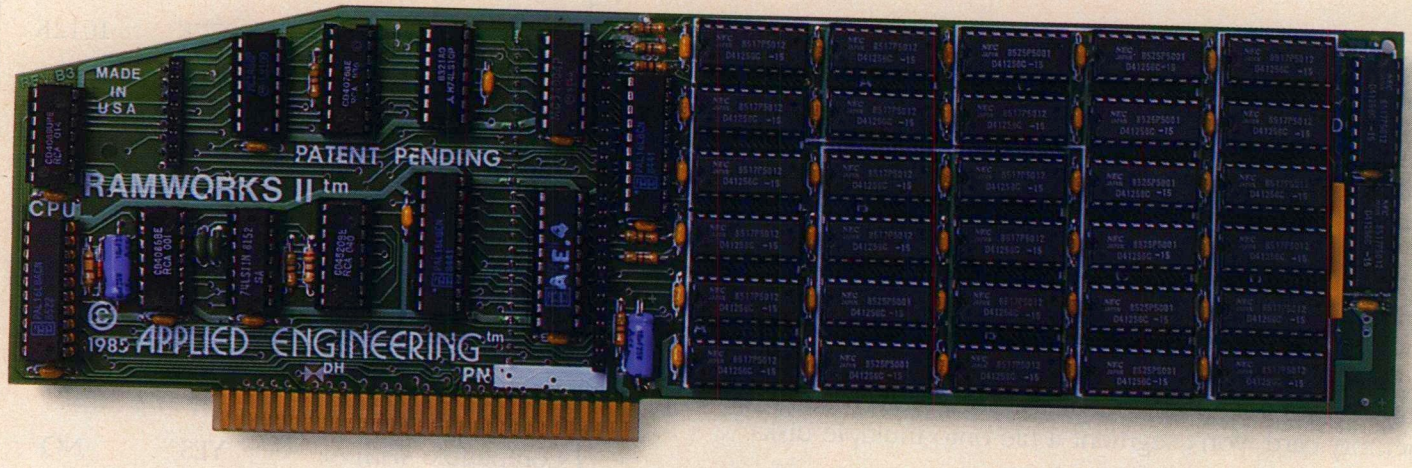
Meet RamWorks II™

An Impressive New Version of a Most Impressive Expansion Card.



RamWorks II. A Generation Ahead. Again.

The best selling expansion card for the Apple IIe just got even better. With RamWorks II, expand your IIe to an incredible 3 megabytes of usable RAM.

Turbo Charged AppleWorks.

RamWorks II plugs into the IIe auxiliary slot and acts just like Apple's extended 80 column card, only better—because if you buy a 256K or larger card, AppleWorks will automatically load itself into RamWorks II. This dramatically increases AppleWorks' speed and power because it effectively eliminates the time required to access disk drive 1. Now, switch from word processing to spreadsheet to database management at the speed of light. AppleWorks responds the moment your fingers touch the keyboard.

But AppleWorks has certain internal limits, independent of available memory. Fear not. Only RamWorks II (and the original RamWorks of course) removes those limits. Only RamWorks II increases the maximum number of records available from 1,350 to over 16,000. Only RamWorks II actually increases the number of lines permitted in the word processing mode. And only RamWorks II features a built-in printer buffer, so you no longer have to wait for your printer to stop before going back to AppleWorks (256K or larger RamWorks II required).

With RamWorks II, you won't have to split your data into 2 or more separate files because you'll have the necessary memory to access ALL your data ALL the time, quickly and conveniently.

RamWorks II	AppleWorks Desktop
128K	101K
256K	183K
512K	367K
1 MEG	736K
1.5 MEG	1104K
3 MEG	2205K

The Most Friendly, Most Expandable Card Available.

RamWorks II is compatible with more off-the-shelf software than any other RAM card. Popular programs like Advanced VisiCalc, Magic Office System, Flashcalc, The Spread Sheet, Diversi-DOS, Supercalc 3A, Magicalc, etc. (and hardware add-ons like Profile and Sider hard disks). Fact is, only RamWorks is 100% compatible with all software written for the Apple 80 column and extended 80 column cards. In addition, RamWorks II can emulate most other RAM cards, so you can use programs written for them without modification. And any size RamWorks II can be user upgraded later to any larger size.

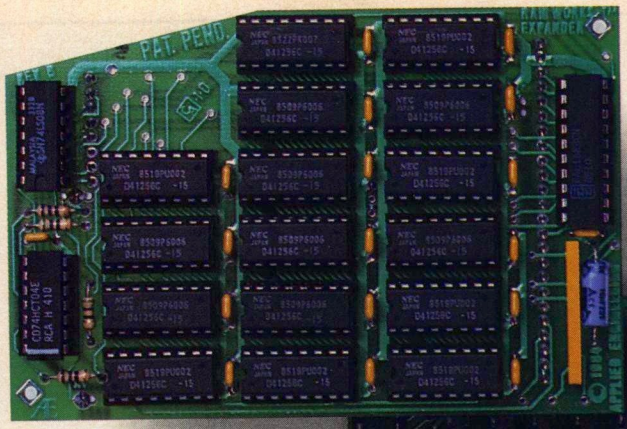
RamWorks II was designed so you could take full advantage of future developments in 16 and 32 bit microprocessors. As your needs grow, so can RamWorks II. A handy coprocessor connector allows the latest and greatest coprocessor cards to access all 3 MEG

of RamWorks II memory. And speaking of more memory, RamWorks II has a memory expansion connector on board so a low profile (no slot 1 interference) memory expansion card can add another 512K or 2 MEG of memory.

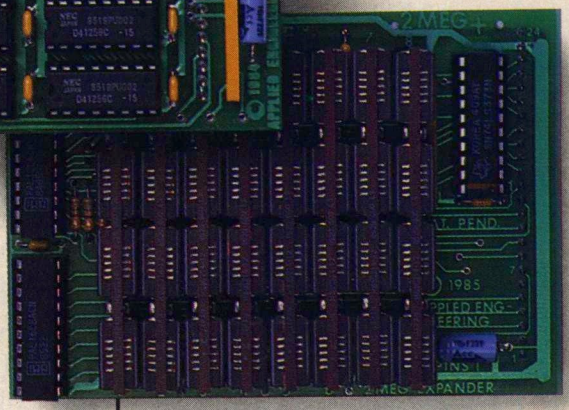
Should you ever run low on memory with RamWorks II (unlikely) you can add these expander cards to your RamWorks II at any time. And of course, these expander cards are compatible with original RamWorks too.

It's In Color.

The same slot that's used for memory expansion is also the slot that's used for RGB color display. RamWorks II lets you decide later to add RGB color. For only $129, an RGB option can be added to RamWorks II to give you double high resolution color graphics and 80 column text. All with razor sharp, vivid brilliance that's unsurpassed in the industry. The RGB option does not waste another valuable slot, but rather plugs into the back of RamWorks II with no slot 1 interference (works on the original RamWorks, too) and attaches to any Apple compatible monitor. And remember. You can order the RGB option with your RamWorks II. Or add it on at a later date.

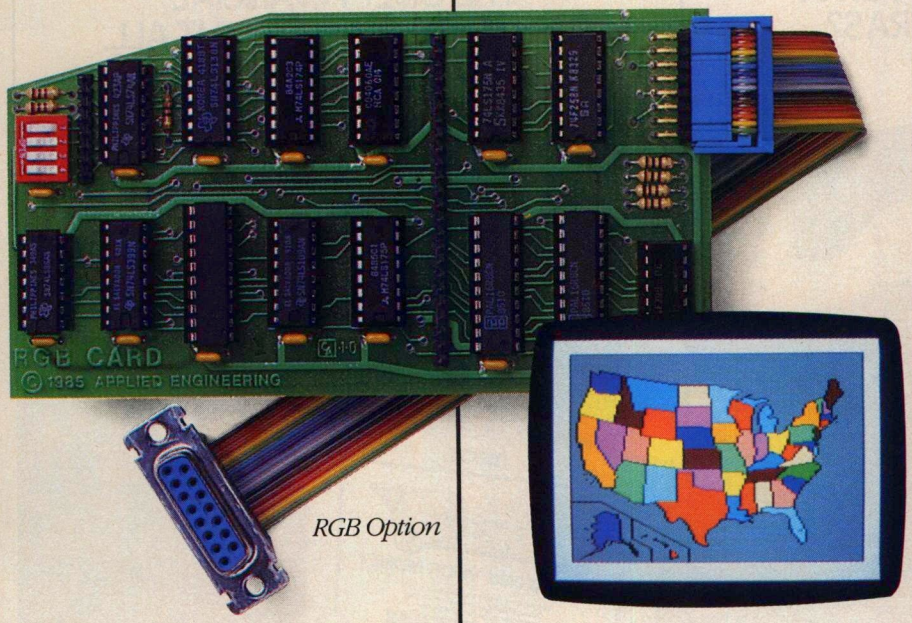


512K Expander



2 MEG Expander

No problem. The memory chips on the card that you now have, which is where most of the money is, can be unplugged and then plugged into the expansion sockets on RamWorks II.



RGB Option

It's Got It All.

- 15 Day Money Back Guarantee
- Super sharp 80 column text (patent pending) with or without RGB option
- Double high resolution graphics (with or without RGB option)
- Expandable up to 1 Meg (1024K) on main board
- Expandable to 3 Meg (3072K) with expander (piggyback) card
- Can use 64K or 256K RAMS in any combination
- Linear addressing coprocessor port
- Automatic AppleWorks expansion up to 2205K desktop
- Accelerates AppleWorks
- Built-in AppleWorks printer buffer
- The only large RAM card that's 100% compatible with all IIe software
- RAMDRIVE™ software available, compatible with Applesoft, PRO-DOS, DOS 3.3, PASCAL and CP/M ($29.00)
- Compatible RGB option
- Built-in self diagnostics software
- No slot 1 interference
- Lowest power consumption (patent pending)
- Takes only one slot
- Software industry standard
- Advanced Computer Aided Design
- Used by Apple Computer, Steve Wozniak and virtually all software companies
- 5 year no hassle warranty

RamWorks II with 64K	**$ 179**
RamWorks II with 128K	**$ 219**
RamWorks II with 256K	**$ 249**
RamWorks II with 512K	**$ 319**
RamWorks II with 1 MEG	**$ 519**
RamWorks II with 1.5 MEG	**$ 719**
RamWorks II with 3 MEG	**$1699**
RGB Option (can be added later)	**$ 129**

It Corrects Mistakes.

Let's say you bought some other RAM card (and that's a mistake) and your RAM card is not being recognized by AppleWorks, Advanced Visicalc, Flashcalc, Supercalc 3A, or other programs, and you want RamWorks II.

RamWorks II. Like the original, it's rather extraordinary. But then some things never change.

ORDER YOUR RamWorks II TODAY. (9 a.m. to 11 p.m. 7 Days, or send check or money order to Applied Engineering.

MasterCard, Visa and C.O.D. welcome. Texas Residents add 5⅛% sales tax. Add $10.00 outside U.S.A.)

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MANAGING YOUR APPOINTMENTS?
MANAGING YOUR DIVIDENDS?
MANAGING YOUR INTEREST?
MANAGING YOUR RECORDS?
MANAGING YOUR VALUABLES?
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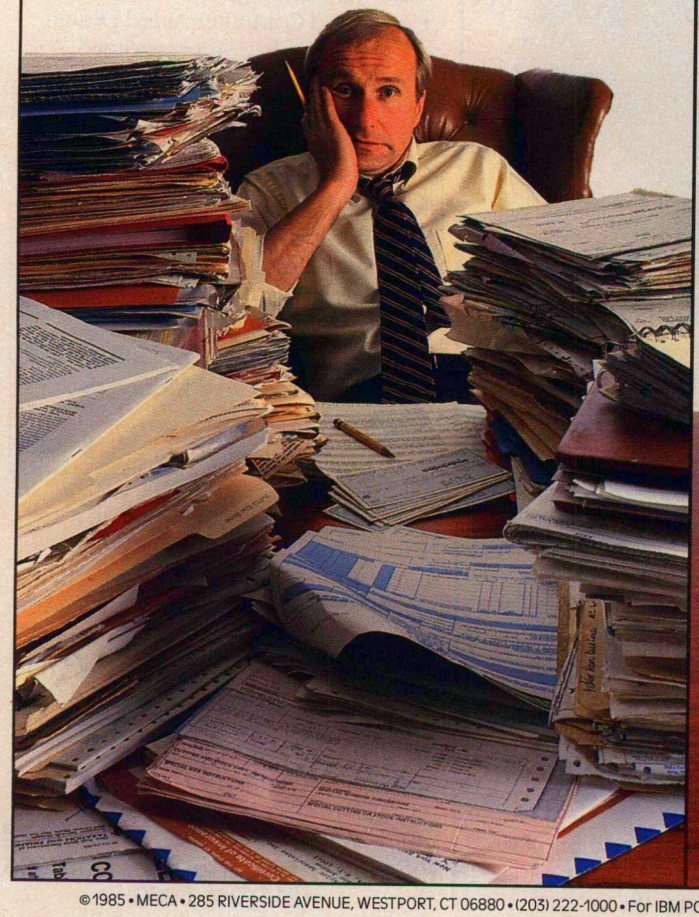
SOFTWARE THAT DOES IT ALL.



Software that makes your personal computer worth having.

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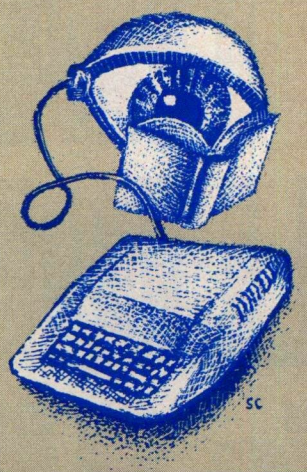
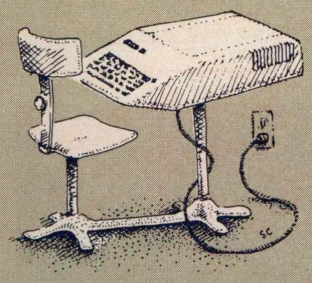
CIRCLE 325 ON READER SERVICE CARD

Eavesdroppers can see exactly what is displayed on a computer monitor.



APPLE WINS $2 MILLION CONTRACT

Apple's sales in the education market remain excellent. Apple recently made a single sale of 1500 128K Apple IIe computer sys-



tems to the Jefferson County School District in Louisville, Kentucky—one of the nation's 20 largest school systems. Apple is still regarded as the premier supplier of microcomputers to education, especially in the K–12 market.

ACQUISITIONS RAMPANT

Ashton-Tate has made a $19 million takeover bid for Multimate International, producer of one of the best-selling word-processing packages for the IBM PC. Ashton-Tate is working on several Macintosh products, and the acquisition of Multimate may mean that Ashton-Tate will consider transporting Multimate's word-processing program to the Macintosh.

NEW OPTICAL SCANNER

The Softstrip System is a new optical scanner that uses a $200 optical scanner to read information printed on ordinary strips of paper. Each data strip takes up less than one third of an 8½ × 11-inch sheet of paper, yet can store about 5500 characters of information, roughly three typewritten pages. Once printed, the data strips can be photocopied for distribution, but the software also allows printing of strips that cannot be photocopied, for security purposes. For more information contact Cauzin Systems, 835 South Main Street, Waterbury, CT 06706; (203) 573-0150.

IMAGEWRITER-COMPATIBLE

Printer manufacturers used to fall all over themselves to produce Epson-compatible printers. As a sign of Apple's tremendous strength in the printer marketplace, however, Epson has recently introduced the AP-80, a low-cost ImageWriter-compatible printer that retails for $379.

ELECTRONIC EAVES-DROPPING

In last month's column, I reported that computer communications such as MCI Mail were not protected by federal wiretapping laws. Now, a potentially greater threat to electronic privacy has been documented by Dutch electronics researchers.

The Dutch researchers, working in conjunction with Holland's post, telegraph, and telephone service, have discovered that most personal computers emit a television-like signal that allows electronic eavesdroppers to see exactly what is displayed on a computer monitor at a distance of up to two miles away. The eavesdropper can pick up these signals with a standard TV set and $50 worth of electronics equipment.

To protect against the transmission of these signals, the computer and monitor must be specially shielded, or a scrambling device must be added to the computer's circuitry.

Although electronic eavesdropping of this nature is thought to be quite limited, a Polish spy recently arrested in Bonn, West Germany, was carrying a list of the best locations from which to intercept radiation emitted by computers in West German government agencies and industrial companies.

APPLE SUCCEEDS IN CLAIMS AGAINST GEM

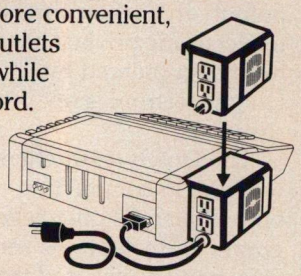
Apple has reached an agreement with Digital Research, Inc., in Apple's suit that alleged that DRI's GEM user interface (a clone of the Macintosh desktop) infringed on Apple's copyrights. Although DRI admits no wrongdoing, the agreement forces it to take immediate action to change GEM application programs and to pay Apple an undisclosed sum for damages.

MORE THAN ¼ MILLION APPLE II's SAVED

SYSTEM SAVER® from Kensington Microware quietly protects more than 1/4 million Apple® II's every day. Often referred to as "the piece Apple forgot," System Saver's unique combination of features have made it the most versatile, most convenient, best selling accessory ever made for the Apple.

System Saver organizes your power needs.

To make your Apple system more convenient, System Saver provides extra outlets for your monitor and printer, while replacing the Apple's power cord. One front-mounted power switch controls your whole system.



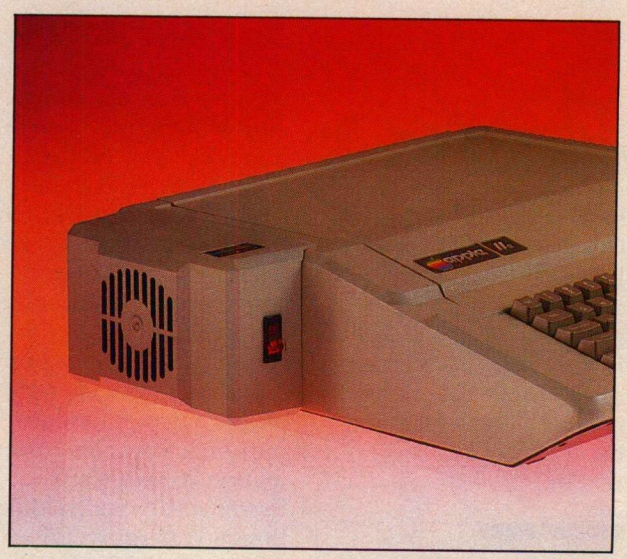
System Saver solves power line problems.

Impurities in the power supply cause 70-90% of all microcomputer malfunctions. Line noise can be interpreted as data, confusing your Apple and causing annoying system errors. Power surges and spikes can do costly damage to your computer's delicate circuitry.

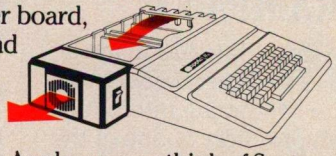
System Saver clips surges and spikes at a safe level and filters out line noise. It makes your Apple more accurate, more efficient and more reliable.

System Saver keeps your Apple cool.

Peripheral cards added to your Apple not only generate heat, they block any natural air flow through the computer. The resulting high temperature conditions can potentially shorten the lives of both your Apple and your peripheral cards.



System Saver's quiet fan draws a breath of fresh air across the Apple's mother board, over the power supply and out the side ventilation slots at the rate of 17 cubic feet per minute.



More than 1/4 million Apple owners think of System Saver as the piece Apple forgot. And 1/4 million well-protected Apples agree. Available at your local dealer. For more information, contact Kensington Microware, 251 Park Avenue South, NY, NY 10010, (212) 475-5200 Telex: 467383 KML NY.

KENSINGTON® MICROWARE

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Also available in 220/240 Volts, 50/60 Hz.

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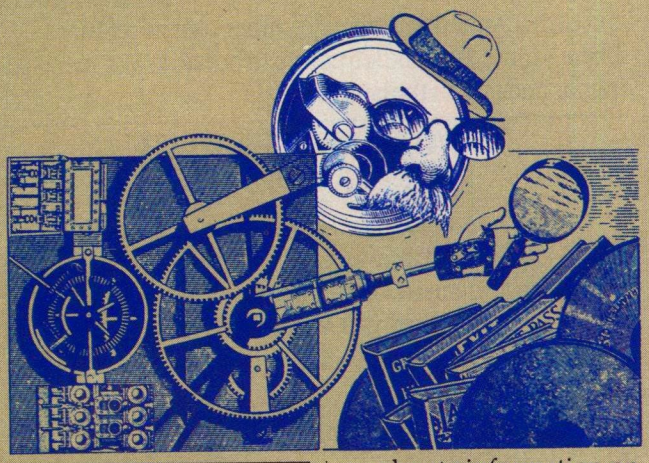
CIRCLE 134 ON READER SERVICE CARD

Microsoft is sponsoring the First International Conference on CD-ROM.



INFORMATION ENGINE

So, what do you do with 500 megabytes? That's a question a lot of people are asking when they first hear about the whopping amount of storage on a CD-ROM. Well, imagine all the textbooks you'll need for four years of college on a single CD-ROM. Or how about computer-repair, appliance-repair, or automobile-repair guides. Or perhaps the Oxford English Dictionary, the complete works of Shakespeare, or the Library of Congress card catalog would be of more interest.

With CD-ROMs you can not only have these great works in your library, but your computer can also search through them to locate information at speeds that would be impossible by hand. In today's world, information is power, and CD-ROMs open up a new realm of information resources.

Once you've amassed all that information on CD-ROMs, you will need good software tools to let you locate information on the CD-ROMs. A traditional database is not the most appropriate tool for searching through vast volumes of text. So several companies are working on new software tools that address the needs of using CD-ROMs. One of the most promising products I've seen yet is the Information Engine from Pinpoint Software of Oakland, California. Information Engine is a text-search-and-retrieval software product that facilitates finding information contained in unformatted text files.

Information Engine's features include Boolean searching with and, or, and not; a vocabulary browser that indicates word frequencies; and a ThinkTank-like ability to create expandable outlines. The product, which is still under development, works with a storage volume of any size, from a text file stored on an Apple II 5¼-inch floppy to a gargantuan volume with up to 550 billion entries with two megabytes apiece. Now that's a lot of information!

CD-ROM CONFERENCE

Microsoft is sponsoring the First International Conference on CD-ROM this coming spring. According to Microsoft chairman Bill Gates, "This conference will serve as a catalyst for integrating CD-ROM technology into personal computers." The conference will be held March 3–6 at the Sheraton Hotel in Seattle. We'll be attending this conference and will provide continuing coverage of CD-ROM technology in upcoming issues of *A+*.

NEW BOARD HAS GEM AND A CD-ROM CONTROLLER

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MicroTrends will sell the CD-ROM controller upgrade as part of a package that will also contain a Sony CD-ROM player and a CD-ROM that contains an electronic version of Grolier's *Academic American Encyclopedia*. For more information, contact MicroTrends, 650 Woodfield Drive, Suite 730, Schaumburg, IL 60195; (312) 310-8928.

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Networks let disparate computers work together.

Making the Hardware Connection

Over the past few years, those of us who use Apple computers in business have been backed into an increasingly difficult corner of incompatibility by the rise of the IBM PC.

Longtime users of Apple IIs or Macintoshes are finding it hard to share files with their PC-using co-workers, and people just buying a computer must face a tough choice between Apple's ease of use and the PC's domination of the workplace.

The problem has become particularly acute since the arrival of the Macintosh, because a significant number of managers new to desktop computing prefer the Mac to the world of PC-DOS. If you're in this situation, you'd better have a good solution to the compatibility issue when the folks in data processing find out you're not buying Blue.

Coming in from the Cold

Fortunately, several network hardware and software solutions are available that can make the data link between IBM, Apple, and other computers. Some solutions have been around for years, and others are just arriving on the scene, but among them, there's probably one that can bring you and your Apple computer in from the cold.

Ground Rules

Before we get into specific solutions, here are some basic ground rules you have to keep in mind when you're thinking about networks. First, many networks can provide a physical connection that moves data between your Apple and a PC, but actually using data created on a different operating system is a more difficult matter. Even if your Apple can physically get to the data a PC or other system has created, it must be able to use it with the program that you are running.

A common example is Lotus 1-2-3. A spreadsheet file stored in 1-2-3's .wks data format can be made available to an Apple II or Mac on a network, but unless the software you're running can read data in this format, the data is useless. Currently, the only Macintosh programs that can read 1-2-3 files directly are Lotus Jazz and Microsoft Excel. Of course, if the PC data you want is stored as an ASCII file (which is the format the majority of the programs use), your chances of using it with your program are much greater, because many programs can use ASCII data.

A second ground rule involves the network software itself. Networks don't just work automatically—they need software that handles all that data sharing, printer sharing, and data conversion. Different brands of network software require different amounts of effort from users. Some of them are fairly "smart" and transparent, and others are comparatively "stupid" and clumsy. One brand of software might feature a network utility that lets you determine which users are currently on the network, for example; other brands don't let you ascertain this information.

Share Alike

Along with the basic network-operating software and the administration software that lets you determine who is on the network or which volumes are in use, network vendors also offer printer-serving and file-conversion programs that allow users to share printers on the network or transfer files among different hard-disk volumes. Sometimes these extra programs are bundled with the basic network software, but often they are extra.

Another ground rule about networks is that there's a difference between sharing files and sharing a hard disk. Most network software these days gives you a disk-sharing system that lets you divide a hard disk into several volumes, each of which stores files from a different computer or a different operating system. A disk-sharing system lets you keep all the files created by different computers on the same disk, but transferring those files from, say, a PC-DOS volume to a Macintosh volume involves an extra step. On a disk-sharing system, you can't directly access files in different volumes.

The other, newer type of network software provides a file-sharing sys-

CARTER DOW PHOTOGRAPHY

tem, in which files in any volume (regardless of the operating system for which the volume was created) are directly available to any computer on the network.

Whether the network offers disk sharing or file sharing, though, it must overcome the problem of file-access conflicts. If one MacWrite user is working with a file and another user wants to work with the same file, the network has to have a mechanism to prevent such a conflict. On a disk-sharing system, you take care of file-access conflicts by assigning each disk volume (or portions of a volume) to an individual user. Only one user can access his or her own volume, so two or more people cannot be working with the same file in the same volume at once.

File-sharing networks can allow more than one user to access the same file in the same volume, so these networks handle potential access conflicts with file locking and record locking. File locking automatically "locks" individual data files that are in use, so that other users can't work with them. Record locking performs the same function on individual records in a database file—it's more sophisticated (and therefore harder to put in place), because it allows many users to access the same database file but restricts individual records in the file to access by only one user at a time.

Whether the network offers disk sharing or file sharing, it must overcome the problem of file-access conflicts.

File-sharing networks have been much slower to emerge than disk-sharing networks, because they are much more advanced. They require not only that the hard disk operate in a certain way, but they also require the application software to work in a particular manner. Most application software was designed for single-user systems, so special network versions of application software must be designed to work with file-sharing networks. It's a Catch-22 situation: Application-software companies will not create network versions of their software until enough networks are in use to create a market, and many would-be network buyers won't opt for a network until true network applications are available.

The final ground rule is that networks for different computer systems may use entirely different types of cabling. AppleTalk cable is totally incompatible with Ethernet cable, for example. With these fundamentals in mind, let's look at some current network solutions that allow data sharing among Apples, IBM PCs, and other systems.

Sun Net

Sunol Systems' Sun Net system permits a wide variety of personal computers to share disk storage and printers on a network. Sun Net supports more than 20 different computer brands, including Apple II, III, Lisa, and Macintosh; DEC Rainbow; IBM PC, XT, and AT; Epson QX-10; Kaypro; Texas Instruments; Osborne; Victor; Compaq; Zenith; Televideo; Eagle; Sanyo; Wang; and most IBM-compatibles. Each Sun Disk hard disk can support up to seven different operating systems at a time, and Sun Net's twisted-pair cabling can handle a network spanning up to one mile. Sun Disks are available in sizes rang-

SHARING DATA WITH SUN NET

The Macintosh and a Sunol Systems network help out at Bechtel

At Bechtel Incorporated in San Francisco, a Sunol Systems network is helping with management productivity on an oil-field-development project. The five-year Engineering and Procurement project, undertaken by Bechtel for Sohio Alaska Petroleum Company, involves nearly 2½ million hours of design for facilities at Alaska's Prudhoe Bay oil field. The highly automated effort uses 12 Macintoshes and 25 IBM PC XT/ATs, plus Alpha Micro, HP-1000, and Wang OIS systems. To help share the data and coordinate project-management data, schedules, budgets, and some 500 employees, Engineering Supervisor Oliver Sweningsen chose a Sun Net diskserver running on an AppleTalk network. The project network links six Macintoshes and an IBM PC AT with a 45-megabyte Sun Disc and Apple LaserWriter.

Sweningsen attended a Macintosh show in the spring of 1985, looking for a network solution. "We decided that Sunol Systems was the farthest along with Macintosh networks," he says. The group set up the network between the third and eighth floors of an office building, using ordinary two-wire cable that was already in the walls. "We just cut the AppleTalk connectors off some AppleTalk cable and wired them to the two-wire cable," he explains, "and it worked fine."

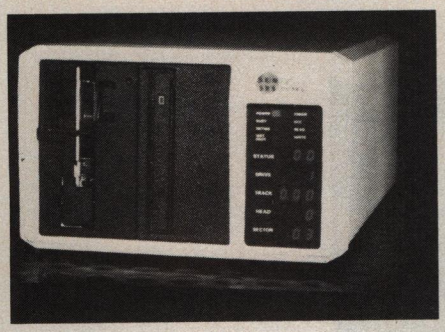
Although the group bought individual copies of application software for each computer on the network, Sweningsen set up one of the Sun Disk's volumes as a program area containing Microsoft Word and File, Multiplan, Chart, and Excel (which Bechtel is evaluating for Microsoft). Also in individual user volumes are MacDraw software for engineering tasks, MacProject for scheduling, and Omnis 3 database software.

Since Sun Net is a disk-sharing system, the Sun Disk's program volume doesn't normally allow more than one user to access it. With some help from in-house programmers and the Berkeley Macintosh User's Group (BMUG), however, Sweningsen was able to turn the program volume into a read-only volume that allowed access by all users. The other volumes on the disk are set up for individual Macs, the IBM PC, and the Sun Share area that lets people exchange files.

The main benefits of the network are the sharing of the hard-disk system, which provides fast access to data from the Macintoshes; the sharing of the LaserWriter printer; and the exchange of data among users in the group. "We exchange a lot of data between 1-2-3 worksheets on the IBM PC and Excel on the Macintosh," Sweningsen says. Excel's built-in data-interchange facilities for importing Lotus files make this process fairly simple, although Mac users must first ask PC users to put the files they want into the Sun Share volume. "If

ing from 10 megabytes ($2195) to 110 megabytes ($7195).

Sun Net is a disk-sharing system: It maintains files from different operating systems on separate volumes, and you can partition each volume into as many as 16 "virtual disk drives," each of which can be assigned to a different network user. Thus, Sun Net eliminates access conflicts by making them impossible—each user gets exclusive rights to one or more "disks" on a volume. Although this arrangement eliminates file-access conflicts, it also complicates the exchange of data among different users. When you want to transfer data from one volume to another operating system's volume (or from one user's disk to another user's disk), you must use a utility called Sun Share.



Sunol Systems' Sun Net system

Sun Share creates a separate volume for transferred information, so you can't transfer a file directly from one user's disk to another user's disk. If User 1 wants to use a file located on User 2's disk, for example, he must ask User 2 to put that file in the Sun Share volume. Once the file is in the Sun Share volume, User 1 can load it.

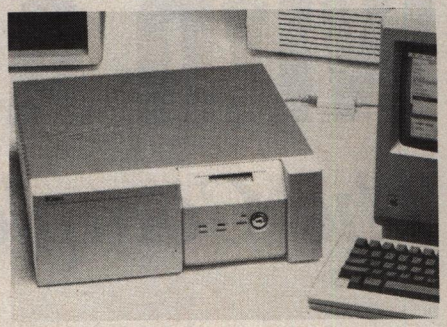
Sun Share also allows one type of computer (say an IBM PC) to use a hard disk or printer that is directly connected to another kind of computer (say a Macintosh), rather than being located on the network. The Sun Net software sells from about $225 per user (including the necessary interface card and cable). For every four systems you connect, you must install a Sunol Quadplexer ($400) in order to make the connection to the hard disk. The Sun Server printserver, which supports two printers on the network, is $1295. An internal streaming-tape backup that costs $1350 is also available for the hard disks as an option.

A typical Sun Net system linking three Macintoshes, two Apple IIe's, two IBM PCs, and two printers to a 16-megabyte hard disk (without a tape backup) in a 1000-foot network costs about $6500.

Sunol Systems also has available an AppleTalk-compatible network for Macintoshes only, and, like most network vendors, the company is working on a file-sharing network.

EtherMac

EtherMac is 3Com Corporation's entry into the Macintosh-network market. EtherMac is an AppleTalk extension of 3Com's EtherSeries product line. EtherMac software lets up to 31 Macintosh computers share one of 3Com's 3Server hard disks on a standard AppleTalk network. Because the 3Server is the standard fileserver for all of 3Com's networks, you can use it to store files from Ethernet networks



3COM Corporation's EtherMac

Mac users know they'll need some 1-2-3 worksheets," he says, "they can call the PC user on the phone and ask him to put the files into Sun Share, and then the Mac users can load them."

The real benefit of using the network is simply the ability to provide computer power to a lot of people who wouldn't otherwise have it. Employees on the project are using the Macs to do materials lists, work schedules, drafting, and cost analyses that would typically have been done either by hand or on a minicomputer system.

"We have been using $100,000-per-station ComputerVision drafting equipment for engineering drawings," says Sweningsen, "and now some of the engineers are finding they can handle many two-dimensional applications on a $3000 Macintosh. We started this project with a mainframe budget three years ago and have saved more than a million dollars by using micros, especially the Macintosh."

Besides the savings on computer services, a tremendous benefit of putting multistep manual processes on a Mac is that it is only one step from conception to high-quality LaserWriter output. One engineering manager found IBM PCs somewhat intimidating but learned to use a Mac over the weekend with no outside help. Now he's using ThinkTank, complex Excel spreadsheets, and Microplanner to plan, organize, and control his job.

The advantages of disk sharing and network access to the LaserWriter far outweigh the occasional problems.

Despite the group's enthusiasm for its current system, however, life hasn't been all roses. On more than one occasion, individual user volumes have become unreadable because of the lack of built-in software safeguards, and Sweningsen has had to recreate them. "We haven't lost any valuable data," he says, "because the engineers had backups." Another shortcoming is that some of the Macs on the network have different revisions of the ROM software, requiring different start-up procedures. Sweningsen, whose Mac is on the eighth floor (most of the others are on the third floor), has no way of determining through the Sun Net software which users are on the network and which volumes are being accessed.

This ability, which comes under the heading of network-administration capabilities, is one of the items on Sweningsen's wish list, which also includes spooling and messaging. The other item is more basic: "We'd really like a file-sharing network," he says.

Nevertheless, the advantages of disk sharing and network access to the LaserWriter far outweigh the occasional problems. "We're saving time and money by printing entire manuals from Mac files onto the LaserWriter now," he says. "A lot of the services we used to send out for, such as drawing and pasteup, are done right at people's desks with a Macintosh now."

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CIRCLE 260 ON READER SERVICE CARD

on an IBM PC as well, which allows Macintosh users to share files with PC users. An Apple LaserWriter printer can take care of printing jobs from Macintoshes as well as from IBM PCs.

All 3Com networks use EtherNet, a cabling and communications-hardware system developed by 3Com president Robert Metcalf, which has become one of the most popular types of network hardware. Ethernet cabling is coaxial and is more expensive than the simple twisted-pair wiring of the AppleTalk or Sun Net networks.

The EtherMac system consists of a 3Server hard disk (36- and 70-megabyte versions are available for $7995 and $8995, respectively) and AppleTalk cabling. The 3Server has an optional 60-megabyte tape-backup unit ($3295), and you can increase the storage capacity to 420 megabytes. A printserver called EtherPrint ($395 per server) is also available for the network.

The link between Macs and IBM PCs in this system is the 3Server itself, which can store information from both an AppleTalk and an Ethernet network at the same time. The 3Server comes with 512K of RAM, expandable to 896K.

Basically, the 3Server is still an IBM-PC-compatible product. The EtherMac network software must be loaded onto the 3Server by an IBM PC, and a Mac can access the software only with the help of MacTerminal and a serial cable, which you must get from an Apple dealer. You also need a 3Server Port Expansion board ($695) to connect the AppleTalk network to the hard disk.

As such, the EtherMac system is probably best suited to offices that have an existing Ethernet network of PCs. EtherMac lets you connect to such a network by linking a Mac-only AppleTalk network to it. Once you do this, you can use the EtherShare file-transfer software ($695) to move data between the two types of computers. In fact, you can connect several AppleTalk networks to an Ethernet network. Like Sun Net, EtherMac is a disk-sharing system.

Assuming you had an existing Ethernet system for IBM PCs and you wanted to connect it to an AppleTalk network consisting of three Macintoshes and a LaserWriter the hardware and software would cost around $2000. If you purchased a 36-megabyte 3Server and EtherPrint to set up a Mac-only network, the cost would be around $10,000.

TOPS

TOPS, from Centram Systems West, is the first file-sharing network software to be announced for Macintosh networks. Instead of forcing you to divide a hard disk into separate volumes for separate operating systems, TOPS software automatically translates files into the proper format for the host system on which they will be stored. Thus, you can store Mac files in a volume of a PC XT hard disk, right in the same directory with files from Lotus 1-2-3 or MultiMate. TOPS is strictly a software product—it works with either twisted-pair cabling or AppleTalk cable on networks spanning up to 1000 feet. The software, which is scheduled for release in January 1986, will retail for less than $100 per user.

TOPS essentially creates its own operating environment that is compatible with both PC and Mac files. In fact, Centram president Nat Goldhaber points out that TOPS can work on any operating system with a little customization. In the TOPS system, you can designate

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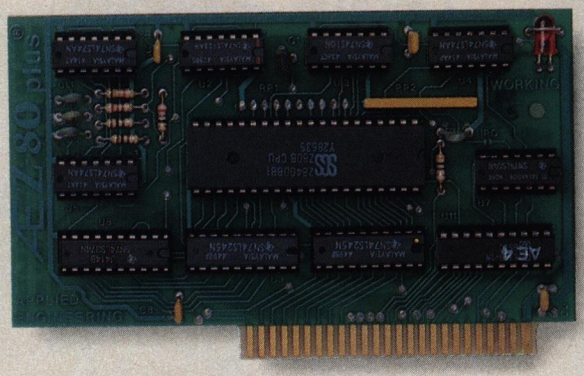

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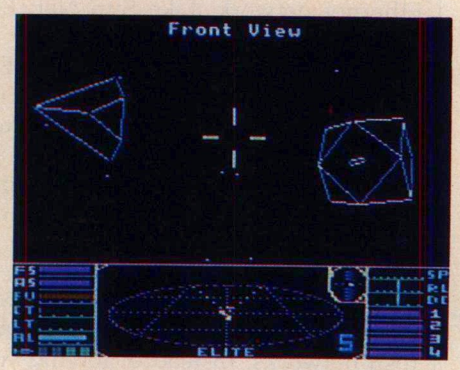

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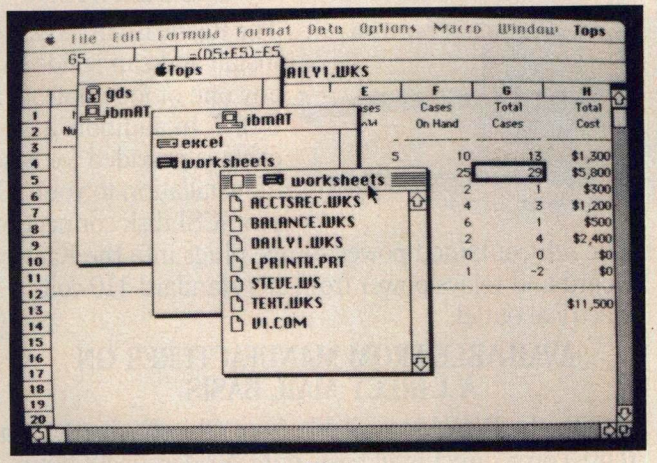
any disk storage device—your Mac's Hyperdrive, for example; a PC's built-in hard disk; an external file-server; or even a floppy-disk drive—as a server on the network. Once you've informed TOPS that you've assigned a certain disk unit to be a server, other users can store files from either a PC or a Mac on it, as if the disk were located on their own system.

Of course, when your personal hard disk is doubling as a network server, you have to sacrifice some of your computer's processing time so that the computer can handle requests for files on your hard disk when they come in. The server software on your computer runs in the background, invisibly behind any application you may be running. Centram claims that unless your network has more than ten users or the file-access traffic on your system is particularly heavy, you should be able to use your system for your own work without being aware of all the extra processing.



TOPS, from Centram Systems West

Even if you end up having to dedicate one computer and its hard disk for network service exclusively, the computer and its built-in hard disk could well cost less than many network-serving hard disks. Centram is now negotiating with hard-disk manufacturers about the possibility of their bundling the TOPS software with stand-alone hard disks so that users can have a network capability for the cost of some cabling alone.

TOPS's file-sharing system means that when you use MacWrite to work with a text file created by an IBM PC program, you can simply load the file—you don't have to move it from a PC volume to a Mac volume. When you are viewing a PC's volume directory on the Mac, all the Mac files appear just as they do normally, and the PC files appear with a PC-shaped icon to let you know they were created on a PC. When you look at a Mac directory on a PC, all the filenames are shortened automatically to fit the PC-DOS filename format. (Filenames can be only a total of 11 characters long on the PC, whereas they can be up to 63 characters on the Macintosh.)

The TOPS software also provides print spooling to the LaserWriter and permits PC users to print their files on the LaserWriter. On an AppleTalk network, the LaserWriter doesn't require additional printserver hardware and software. Centram Systems' IBM PC interface board for the AppleTalk network will retail for less than $300. An Apple II interface board for AppleTalk is in the planning stages.

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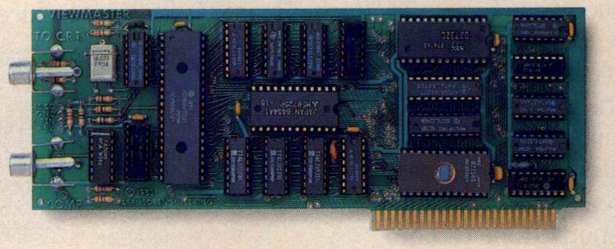

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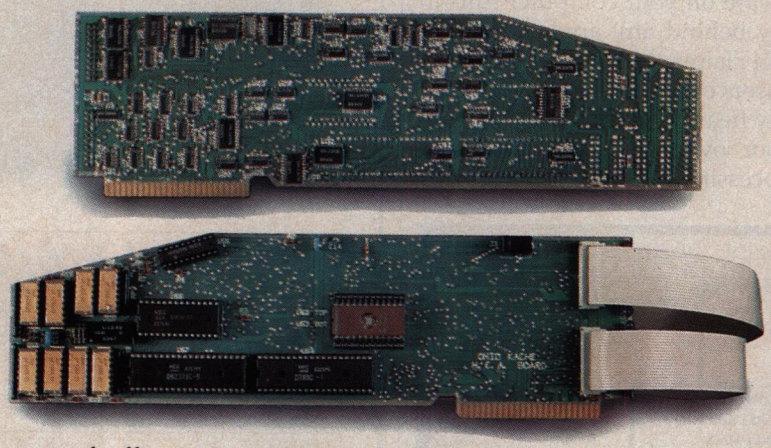

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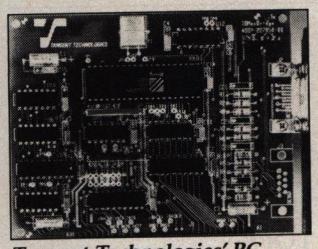
A typical AppleTalk network with TOPS that links two Macs and two IBM PC XTs (and uses the XT hard disks as servers) costs less than $2000. If you want to add Macintosh hard disks, you have to add the cost of the hard disks you choose.

PC MacBridge

PC MacBridge from Tangent Technologies is a board and software for the IBM PC that let it transfer files and print to a LaserWriter on an AppleTalk network. With the board installed in a PC, you can plug an AppleTalk connection directly into the PC.

Using the printing software that comes with the board, you can print WordStar, MultiMate, Lotus 1-2-3, or standard text files on a LaserWriter via the network. The file-transfer software, a PC version of Videx's Mail Center software for the Macintosh, is called MailBox. (Mail Center lets you set up mailbox names for every Mac on an AppleTalk network and transfer files among them.) The MailBox software with PC MacBridge lets you send PC files to Macs (or other PCs) on the network. To enable you to send files between computers, each computer must be running the Mail Center or MailBox software. When you send a file to another computer, the target computer stores the file on disk.

Tangent is also working on additional software that lets a PC access files on an AppleTalk fileserver. Each AppleTalk fileserver made by a different company (Sunol, Corvus, and others) is slightly different, so this software will have to have specific versions for each product. The PC MacBridge board-and-software combination retails for $595.



Tangent Technologies' PC MacBridge

Coming soon: the Corvus Omninet for the Macintosh

Coming Attractions

The foregoing is just a sampling of the networking options available if you're striving for compatibility between your Apple and other desktop systems. Other companies from both the IBM and Apple worlds—including some of the biggest names in networking—are (or soon will be) offering other network solutions.

Corvus Systems, whose Omninet is the oldest of the Apple-compatible networks, is expected to support the Macintosh on its Omninet network during the first quarter of 1986. Omninet can link up to 64 computers and peripherals on one network spanning up to 4000 feet. The computers it currently supports are IBM PC, XT, AT, and PCjr; Apple II Plus, IIe, and III; Corvus Concept; DEC Rainbow 100; Texas Instruments Professional; and Zenith Z-100 and Z-150. The network uses Corvus' OmniDrive hard disks, which are available in sizes from 5 to 126 megabytes.

The network is driven by Corvus' Constellation II software, which lets you create multiple volumes on a hard disk. You store files from different operating systems in different volumes. Like Sun Net, this network is a disk-sharing, as opposed to a file-sharing, system, so if

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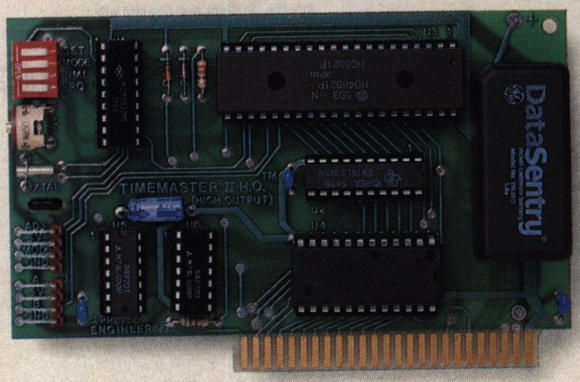

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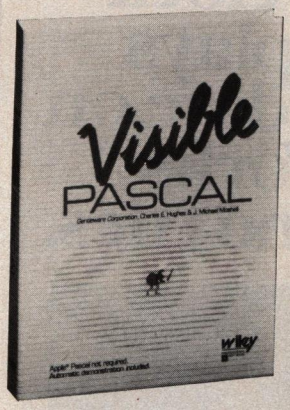

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CIRCLE 114 ON READER SERVICE CARD

you want to use a PC file on your Apple, you must move the file from the PC-DOS volume to the Apple volume.

If you want a Mac-only network, Corvus' recently announced new AppleTalk-compatible software called OmniTalk, which lets up to 63 Macs and printers share a Corvus OmniDrive hard disk, may be for you. This product lets you link Macintoshes in a network with AppleTalk cabling.

Novell, whose Netware software is widely thought to be the most advanced file-sharing network software for the IBM PC world, is also working on a Macintosh product for the AppleTalk network. The project has been delayed, pending the release of Apple's own network fileserver, however. On the PC, Netware offers high performance and transparent file sharing from a hard disk. The Macintosh version of the product is expected to have the same features.

Micro Design, maker of The Keeper hard-disk drives for the Mac, is also developing a network system that offers file sharing on an AppleTalk network. This network is being tested and should be available soon.

See "UNIX Casts Its Net," *A+*, December 1985, pages 165–168 for information on a Macintosh/UNIX network from Lutzky-Baird. +

Charles Rubin's latest computer book, AppleWorks, *was published in July by Microsoft Press. He is also the author of* The Endless Apple *and writes features and reviews for various computer publications.*

PRODUCT INFORMATION

Sun Net
Sunol Systems
1187 Quarry Lane
Pleasanton, CA 94566
(415) 484-3322
List Price: Sun Net software, interface card, and cable, $225 per user; Sun Disk, $2195 (10 megabytes)–$7195 (110 megabytes); Sunol Quadplexer, $400; Sun Server printserver, $1295; internal streaming-tape backup, $1350

EtherMac
3Com Corporation
P.O. Box 7390
Mountain View, CA 94039
(415) 961-9602
List Price: 3Server hard disk, $7995 (36 megabytes) or $8995 (70 megabytes); 60-megabyte tape-backup unit, $3295; EtherPrint printserver, $395; 3Server Port Expansion board, $695; EtherShare file-transfer software, $695

PC MacBridge
Tangent Technologies, Ltd.
5720 Peachtree Parkway, Suite 100
Norcross, GA 30092
(404) 662-0366
List Price: board-and-software combination, $595

TOPS
Centram Systems West, Inc.
2372 Ellsworth Avenue
Berkeley, CA 94704
(415) 644-8244
List Price: software, less than $100 per user; IBM PC interface board for AppleTalk network, less than $300

Omninet
Corvus Systems, Inc.
2100 Corvus Drive
San Jose, CA 95124
(408) 559-7000
List Price: OmniDrive hard-disk starter kit (drive, software, cable, and Transporter network card), $1495 (5 megabytes)–$9495 (126 megabytes); Transporter card with cable, $495; software, $150; 1000-foot spool of Omninet cable, $250

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Software World
Redding
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Novato
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Maxicat
Miami
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Clearwater, Pinellas Park
Software Cellar
Fort Lauderdale
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New York
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Broadway Computers
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Byte Shop
Merrick
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East 33rd Typewriter
New York
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Four Guys
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Great American Software
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J&R Computer Outlet
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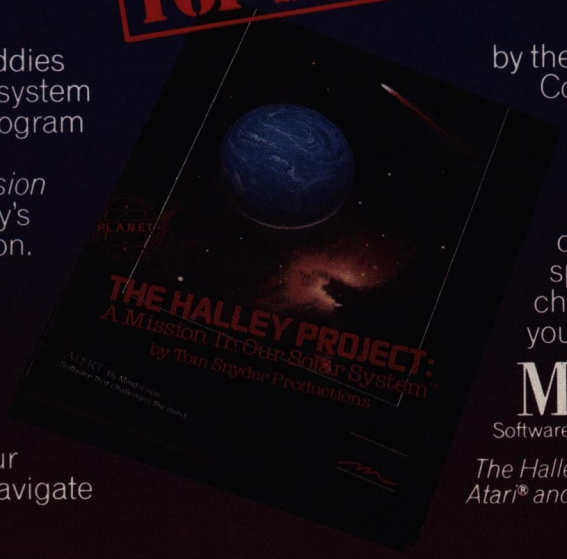

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Software considerations in information transfer

Breaking Down the Barriers

Making a hardware connection between an Apple and another computer is a good first step in exchanging data, but there's often more to be done—an Apple II or a Macintosh can no more read a file intended for another computer than most of us can read Greek.

Just as in human communication, however, you can bridge barriers by translation or bilingualism or resort to more universal systems of information transfer.

Actually, file sharing between different types of computers involves three related questions: sharing data, sharing programs in BASIC or other high-level languages, and sharing binary (machine-language) programs. Data sharing is the easiest, high-level programs are slightly more difficult, and binary programs are the most difficult of all.

In looking at these various areas, we'll assume that the hardware part of the transfer has been taken care of, that either through a serial connection, a network, or a disk-drive-emulator package, we've already figured out how to move the actual file bits and bytes from one computer to another. The step we're interested in here is how to make use of them.

Consider My Data Yours

For data sharing, the main problem is not really with the computers themselves but with the data formatting of the programs that run on them. On the bit level, almost all current desktop- and workstation-size computers employ the same basic hardware encoding, and almost all of them store data in multiples of eight bits or bytes.

Using the same character codes isn't normally enough, though. Just as I can't necessarily read a message in Greek, even if it's written in the modern alphabet, using the same letters as English, an Apple II or Macintosh program can't necessarily read an IBM PC database even if they both use the ASCII codes for their character sets.

What makes Greek a different language, of course, is the way the letters are combined into words and the grammar and syntax of word combination. Similarly, what makes most files from the IBM PC, from UNIX systems, or even from the Macintosh very different from Apple II files is the way the data is arranged. Fortunately, although most programs use their own file formats, a good number are also multilingual—in addition to using their native method of communicating, they can also read and write data in a more standardized form.

For example, AppleWorks can read from and write to two kinds of files, in addition to its own AppleWorks format: DIF (a type of format originally developed for the VisiCalc spreadsheet), for database and spreadsheet data, and ASCII, for ordinary text files. Mouse Calc, the Macintosh-like spreadsheet and graphing package for the Apple II, also reads from and writes to DIF files. Naturally, so does VisiCalc.

Because most spreadsheet and database programs on the IBM PC can read from and write to DIF files, exchanging spreadsheet and database data is quite practical. Most graphing programs, both on Apple-II-series computers and the IBM PC, also accept DIF files, which means you can do your calculations on one machine and your graphing on another.

In Apple CP/M, dBASE II can read both ASCII (text) files and files that use the "comma-delimited" form that most BASIC programs produce. Most other databases running under CP/M, DOS 3.3, or PC-DOS or on the Macintosh also read from and write to comma-delimited files.

On the Macintosh, both Lotus Development Corporation's Jazz and Microsoft's Excel read DIF files as

well as the competing SYLK format developed by Microsoft. These programs also read native-format Lotus 1-2-3 files, which allows data exchange, even if no special steps have been taken to format the data in a more exchangeable form. Excel can also write files in the 1-2-3 format, a feature that Lotus says it will add to future Jazz versions.

Most other spreadsheet programs for the Mac also read DIF and SYLK files, as do many graphing programs and many databases. The Mac has several file formats, however, that have so far proved less susceptible to translation between machines. You can cut and paste pictures as well as text among many Macintosh applications, but no clearly defined standard has yet emerged for transferring graphically enhanced files to other machines.

Fortunately, although most programs use their own file formats, a good number are also multilingual.

With a Little Outside Help

If the programs themselves speak only their own format, another possibility is to turn to translation software. On the Macintosh, for example, DeskTop Software Corporation's 1stPORT can exchange data among any DIF, SYLK, flat (table form), text, and 1stBASE formats. According to Bill Lawless, DeskTop Software's vice president of marketing, typical uses for this communications and file-format-conversion program are uploading and downloading information from mainframes and preparing files for exchange between VisiCalc and Multiplan users.

You can also use a multilingual program as a translator. For example, by reading a DIF datafile into Excel but writing it out in SYLK format, you've done the translation, even though translating is not Excel's principal purpose.

Complete multilingualism is admirable, but, just as many people can

CARTER DOW PHOTOGRAPHY

understand a second language but not speak it, so many programs can import data in a foreign format, even if they can't produce similar output. In the Apple II line, one such program is Interactive Microware's D/S Convert, a $25 program that takes DIF input and produces the IM graphic-language files that the company's other products need to produce graphics output. Scientists and engineers form the largest group of users, the company says.

Building Common Programs

Exchanging data is a good first step in file sharing, but if you've written your own programs, you probably want to be able to share those between machines as well. Although one of the rationales for using high-level languages such as BASIC or Pascal is that you can use the same program on different machines, it often takes a little touching up, in practice, to get a program written for one machine to run on another.

In BASIC, for example, Applesoft BASIC on Apple-II-series computers uses some slightly different constructions than does BASIC for the IBM PC, and Microsoft BASIC for the Mac is not quite the same as either one. All the versions can do the same tasks, at least within the confines of their hardware (such as monochrome only on the Mac or slightly lower resolution on the Apple II or IBM PC), but some instructions have to be in a slightly different form.

You can do the translation by hand, but with larger programs it can be a tedious job. Fortunately, this kind of direct substitution is what computers themselves are quite good at doing. With the right software, any of these machines can do most of the work of translating a BASIC program written for any of the others.

For example, Cape Cod Convertible changes Applesoft to IBM BASIC (and optionally back the other way). Like most BASIC-conversion software, it does not claim to handle assembly-language routines or PEEKs and POKEs (the locations are different on the IBM PC, anyway). To ease processing, the package includes a string-search utility, a program to list all variables in the BASIC code, and a file-comparison utility.

Actually, Cape Cod offers programs to handle several different dialects—you can do Applesoft to PC-DOS BASIC (requires a PC-DOS disk and a PC), PC-DOS to Applesoft (on the Apple), and Apple CP/M to PC-DOS (on either end).

Pascal programs written with the UCSD P-system (which includes Apple Pascal for the Apple II family) are directly exchangeable between machines, but UCSD versions have not been a big hit in the IBM PC or Macintosh markets. You'll have to do a fair amount of editing to move programs between Apple Pascal for the Apple II, Macintosh Pascal, and most varieties of Pascal for the IBM PC. If you're a user of Borland's Turbo Pascal running under Apple CP/M, however, you'll find that it is a compatible subset of Turbo Pascal for MS-DOS and PC-DOS for the IBM PC and similar machines, providing, of course, that you haven't used any special Apple features such as absolute memory addresses to write to the screen.

So-called cross-assemblers run on one machine but produce output meant for another.

Assemble and Resemble

Most of us don't write serious programs in assembly language or machine language, and, even if we do, we don't expect to bring them across to other machines. Even here, you'll find some channels open anyway.

An assembler program that translates the more readable assembly language to machine language doesn't have to produce output for the machine that it's running on. So-called cross-assemblers run on one machine but produce output meant for another. Therefore, you can use, say, an Apple II to develop programs to run on a 68000-based machine such as a Macintosh or on an 8088-based machine such as the IBM PC.

Educational Microcomputer Systems of Irvine, California, is one of several companies offering such cross-assemblers for the Apple family. The firm claims to have models that work across the complete range of popular personal computers, including Apple, IBM, Kaypro, Osborne, and so on. Avocet Systems, of Rockport, Maine, also offers a complete set of cross-development tools.

Strangely enough, many of the larger software houses also use cross-development systems, but they're not

PULLING THE FILES ACROSS

If you hook up two computers, either through a direct serial-port-to-serial-port connection or through modems, you still have to have software to tell them how to exchange files. The simplest method is to use ordinary communications software, although not all packages provide the tools for dealing with "foreign" systems.

Along with these more general programs, you can also find a few specialized communications programs that are designed particularly to support the transfer of files from one computer to another. On the Macintosh, dilithium's PC to Mac and Back comes not only with a disk for the Mac, but also with an IBM PC disk and even a connecting cable for the serial ports. The software facilitates computer-to-computer file exchange, and you can use it as a communications program to dial up information utilities and bulletin boards. In addition to dilithium's entry, you can consider MacLink from DataViz, Inc., a similar program that imports and exports files between the IBM PC and the Macintosh.

If you're trying to exchange data between Apple-II-series machines running different operating systems, you might find it easier to use a disk-transfer program rather than a wire or modem connection. Apple provides some transfer utilities with its system software, but independent firms also have packages to ease the reformatting chore.

If your file universe is all Apple, then Universal File Conversion from Quality Software is one such program that may do the trick for you. This $34.95 program switches files between Apple DOS, ProDOS, SOS, Apple CP/M, and Apple Pascal formats, all using the standard 5¼-inch disk drive. It's particularly useful if you have to go between odd pairings of formats—Apple CP/M and Pascal, for example.

As far as hardware/software combinations are concerned, Quadram's Quadlink board for the IBM PC also reads Apple DOS disk files, so you can transfer files on disk between the Apple and IBM formats.

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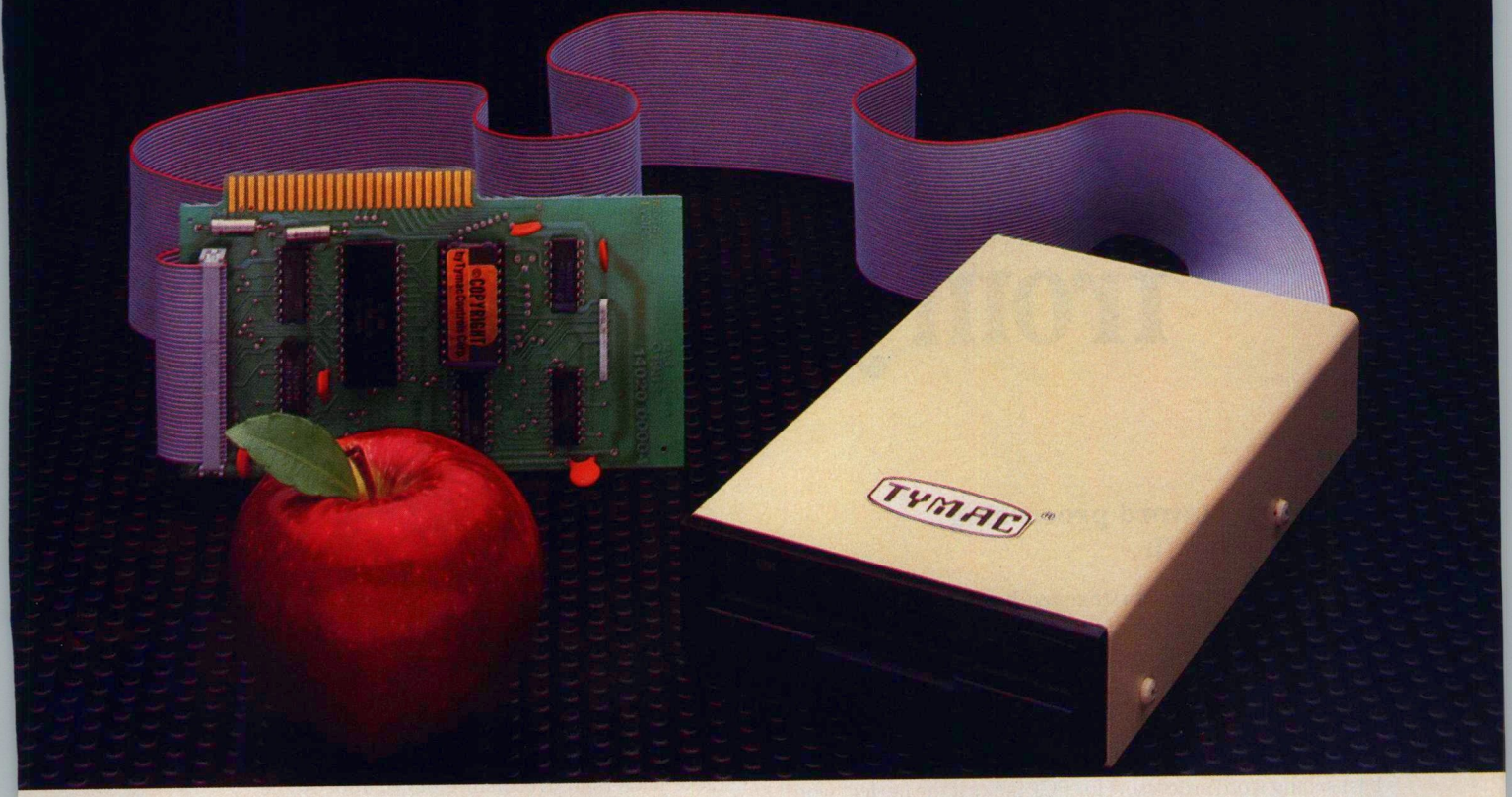

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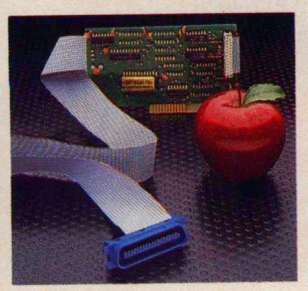

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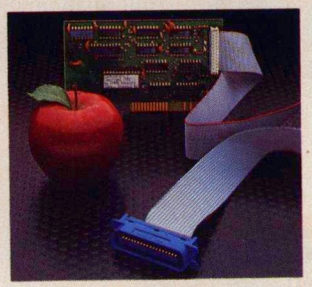

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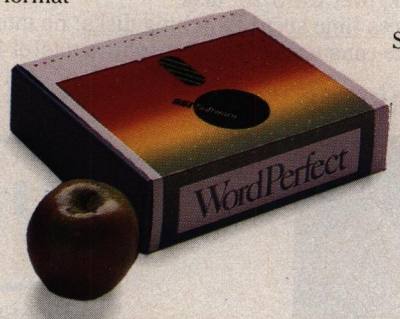

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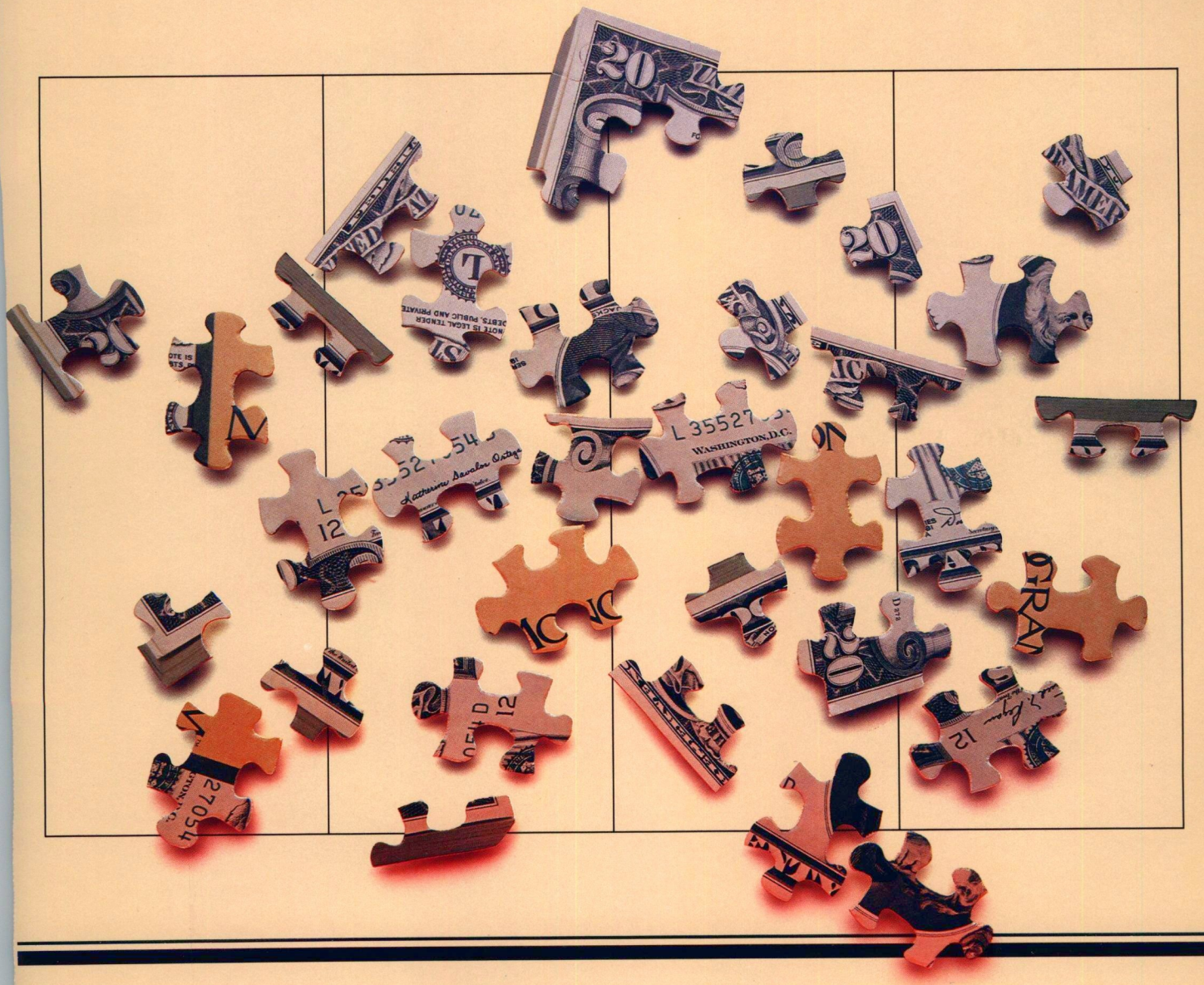

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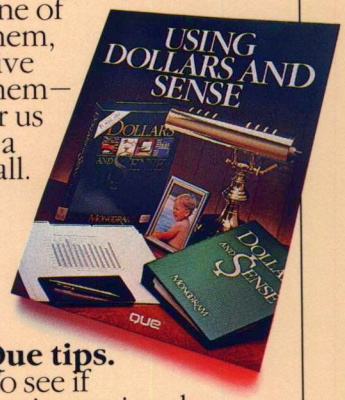

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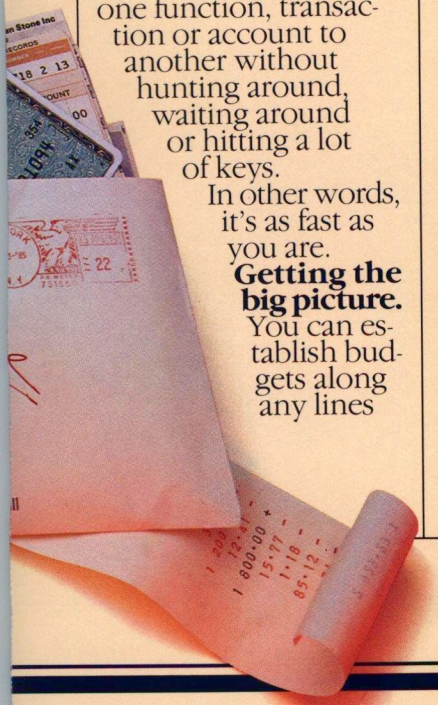

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DATA-EXCHANGE FORMATS

Programs that normally use different file formats can still exchange data if the information is packaged in a commonly recognized format. In the Apple world, the most common of the formats are DIF, VC, SYLK, and comma-delimited.

DIF, which VisiCorp (now merged into Palladin software) claims as a trademark, stands for Data Interchange Format. It was originally developed as a way to move data from the company's VisiCalc spreadsheet package to its charting packages such as VisiPlot and VisiTrend/Plot. Since then, the original format has been extended to allow for database information and other more-general data.

DIF-format files are made entirely of printable characters and common control values, so you can store, retrieve, and send them over communications links as if they were text files. As part of the encoding into DIF, you convert binary or other nonprintable characters into printable form and add information showing where the data belongs (typically the row and column numbers for a spreadsheet).

The SYLK format is gradually expanding to include more types of records and data.

Normally, DIF files are only for data interchange, rather than for ordinary file storage. Because of the extra positioning information and because of the need for extra characters to represent values that can't be printed directly, DIF files take up more space than native-mode files and take longer to read, write, and transfer.

VC format, on the other hand, is the internal format of VisiCalc files and may contain binary characters that have no printable equivalent. In addition, VC-format files use all eight bits of each byte, instead of just the lower seven that printable characters use, so they can't be transmitted over communications links that treat each character as only seven bits.

SYLK is the format Microsoft developed as its own universal exchange language. Like DIF files, SYLK files encode both printable and unprintable values in printable form and pack each value together with the location information necessary to make sense of where it fits into the overall data structure.

Microsoft publishes the complete SYLK specification in several of its manuals, so if you're programming on your own, it's easier to add this format than some less accessible standards. Note, though, that the SYLK format is gradually expanding to include more types of records and data, so be sure to consult a recent copy if you plan to program your own SYLK interface.

Comma-delimited files are ones that follow the format that most versions of BASIC use for ordinary input and output. The name refers to the way each field value (each separate entry) within a line is separated from its neighbors by commas. In addition, text values in this format must be entirely enclosed in quotes.

Comma-delimited files can be used to exchange information between machines or between programs on the same machine. One of their most common uses is in mail-merge applications.

Along with these common file formats, some other arrangements also have multiple uses in the Apple world or between Apple and other machines (see "Macintosh Data Transfer," page 52). Software Publishing's PFS: series has its own file format, which allows exchanges between programs and machines. The format of dBASE II files, referred to as the DBF format, is optionally accepted by many database and mailing-list programs. Lotus Development's WKS (worksheet) format is becoming increasingly acceptable for Macintosh products (although so far only for transferring data and not for macros or other program information). Plain-text files with one item to a line and the fields defined in terms of starting character position are readable by many databases.

developing PC software on an Apple II or Mac software on a PC. Several use large minicomputers or even time-shared mainframes to develop software for micros. In some cases, they say, the advantages of huge hard disks, faster processing, and the ability to share work in a multiuser system outweigh the advantage of using the actual machine the software will run on for development.

If you don't have access to the source code and you want to run a program meant for one machine on

In human and computer languages, a universal standard is unlikely to emerge just yet.

another, you can do that in some applications by using a simulator. This kind of software package keeps track in software of what the original machine would have done in hardware, so, naturally, the process is slower and less efficient. If you don't care if the program runs faster and it's not worthwhile or possible to translate it, using a simulator may be a useful option for you.

Ideally, just as in human communications, we wouldn't have to worry about any of these factors. If machines all spoke a common language, just as if people all had a common tongue, cooperation would be easier, and at least the mechanics of communication would no longer be a barrier.

But in both human and computer languages, for many historical, commercial, and less rational reasons, a common universal standard is unlikely to emerge just yet. For the computers, though, you can find some off-the-shelf solutions. ✚

Consulting Editor Steve Rosenthal is a regular contributor to A+, as well as to other computer publications.

PRODUCT INFORMATION

The Cape Cod Convertible
Cape Cod Software
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Continued on page 50

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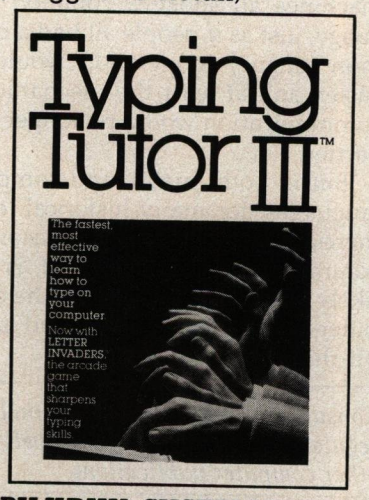

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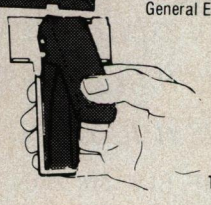

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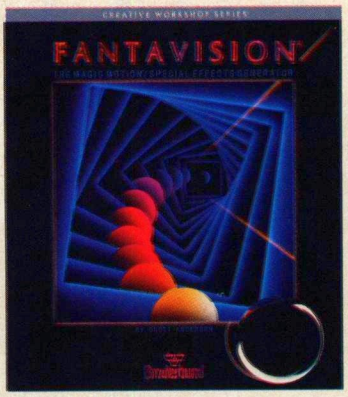

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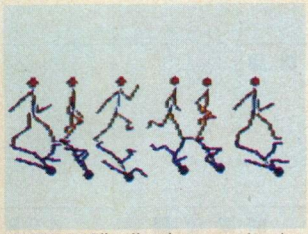

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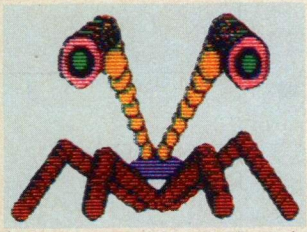
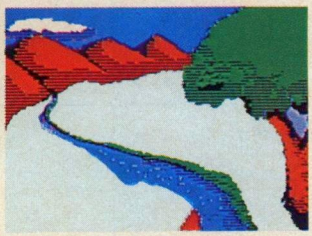


YOU CAN create weird monsters by simply dragging circles around the screen, and using one of the special effects modes.



YOU DON'T HAVE TO be an artist to create vivid Backgrounds for your movies. Fantavision's automatic features make it easy.

IMAGINE how much fun it would be to take a simple drawing and make it come alive, dancing across the screen of your computer.

To draw an egg, and transform it into a fire-breathing dragon.

To invent weird characters and strange, alien worlds.

Then, to combine all this into your own incredible cartoon or movie.

Now, imagine if you could do all that as easily as pressing a button.

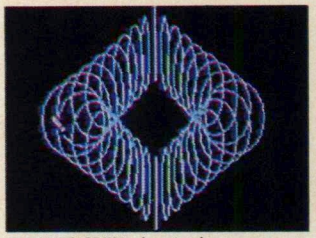
Know what? With Fantavision, you can.

FANTAVISION IS A REVOLUTIONARY SOFTWARE BREAKTHROUGH that, for the *first* time, brings to home computers the special powers known to computer animators as "tweening" and "transforming."

You don't need any artistic ability or computer programming skills. Anything you draw in one frame can be fluidly "transformed" into something else in the next frame. For example, draw a plane in the air in your first frame, and a plane on the runway in your second frame. With Fantavision, your computer can instantly generate—in real time—up to 64 "in-between" frames so that your plane appears to come in smoothly for a realistic, three-point landing.

WHEN YOU SEE THE MAGIC of Fantavision, you won't believe it. When you play with it, you won't be able to stop.

YOU CAN even add Text with Fantavision, and with a single stroke make it "Lean," "Flip," "Squash," "Zoom," or parade around the screen, just like you've seen on television.



IT TAKES ONLY a few simple steps to create intriguing three-dimensional effects.

LOAD HI-RES SCREENS from other programs to make spectacular Backdrops. Then, add your own animation and Text.

Brøderbund®

FANTAVISION is available for Apple personal computers. Look for it at your favorite Brøderbund Software dealer. For more information about Brøderbund products, please write us at 17 Paul Drive, San Rafael, California 94903-2101. Apple is a registered trademark of Apple Computer, Inc. © 1985 Brøderbund Software, Inc.

CIRCLE 251 ON READER SERVICE CARD

MACINTOSH DATA TRANSFER

Although Macintosh, Apple II, and IBM PC programs are quite different and therefore incompatible, much software uses data files that are compatible with the Mac, the IBM PC, and the Apple II series. Some of the prevalent file structures that are compatible are the DIF, SYLK, and ASCII-delimited formats.

As Apple II users acquire Macintoshes, and

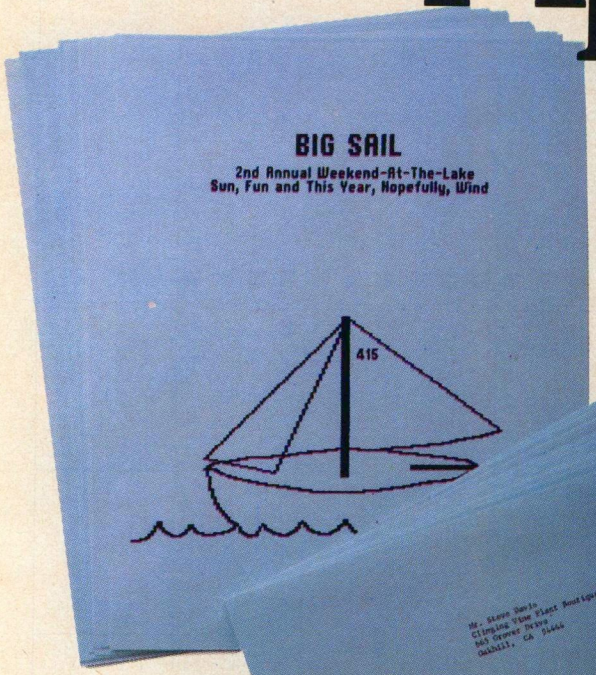
		IMPORT FORMATS										EXPORT FORMATS										
		ASCII-DELIMITED						APPLICATION SOFTWARE				ASCII-DELIMITED						APPLICATION SOFTWARE				
		NULL	COMMA	RETURN	TAB	SPACE	BINARY	SYLK	DIF	WKS	DBASE II	NULL	COMMA	RETURN	TAB	SPACE	BINARY	SYLK	DIF	WKS	DBASE II	NOTES
Crunch Paladin Software Corporation 3255 Scott Blvd., Bldg. 7, Suite C Santa Clara, CA 95054 (408) 970-7300	$295							■														2,10
Helix 1.0, 2.0 Odesta Corporation 4084 Commercial Avenue Northbrook, IL 60062 (312) 498-5615	$395			■	■			■	■					■	■			■	■			6,9
Jazz Lotus Development Corporation 55 Cambridge Parkway Cambridge, MA 02142 (617) 577-8500	$595	■	■	■	■	■	■	■		■			■	■	■	■	■					1,2
MacLink DataViz, Inc. 16 Winfield Street Norwalk, CT 06855 (203) 866-4944	$125	■	■	■	■		■	■		■		■	■	■	■		■	■	■	■		4,5,8
MacLion Computer Software Design, Inc. 1904 Wright Circle Anaheim, CA 92806 (714) 634-1401	$379		■	■	■	■							■	■	■	■						3
MacTransfer Southeastern Software 7743 Briarwood Drive New Orleans, LA 70128 (504) 246-8438	IBM to Mac, $60; Apple to Mac, $45	■	■	■	■			■	■			■	■	■	■			■	■			
MacWrite Apple Computer, Inc. 20525 Mariani Avenue Cupertino, CA 95014 (408) 996-1010	bundled with Macintosh	■	■	■	■	■	■	■					■	■	■	■	■					1
MicroSoft Excel	$395	■	■	■	■	■		■										■			■	2
Microsoft File	$195			■	■									■	■							6
Microsoft Word	$195	■	■	■	■	■	■						■	■	■	■	■					1
Microsoft Works Microsoft Corportion P.O. Box 97200 Bellevue, WA 98009 (206) 828-8080	$295	■	■	■	■	■	■	■					■	■	■	■	■	■				1,2,6

as the Macintosh makes greater inroads into the IBM arena, data transportability becomes more critical. This chart is designed to help you take advantage of the many Macintosh programs that can import and export data in the standard formats of IBM PC and Apple II software. (The boxes indicate the formats that each program accepts.)

		IMPORT FORMATS										EXPORT FORMATS										
		ASCII-DELIMITED						APPLICATION SOFTWARE				ASCII-DELIMITED						APPLICATION SOFTWARE				
		NULL	COMMA	RETURN	TAB	SPACE	BINARY	SYLK	DIF	WKS	DBASE II	NULL	COMMA	RETURN	TAB	SPACE	BINARY	SYLK	DIF	WKS	DBASE II	NOTES
Multiplan Microsoft Corporation P.O. Box 97200 Bellevue, WA 98009 (206) 828-8080	$195							■										■				
Omnis 3 Blyth Software, Inc. 2655 Campus Drive, Suite 150 San Mateo, CA 94403 (415) 571-0222	$495		■	■	■			■	■				■	■	■			■	■			
OverVUE 2.0 ProVUE Development Corporation 222 22nd Street Huntington Beach, CA 92648 (714) 969-2431	$295		■	■	■			■	■		■				■							
PC to Mac and Back dilithium Press P.O. Box 606 Beaverton, OR 97075-0606 (503) 243-3313	$149.95			■			■							■			■					4
PFS:File Software Publishing Corporation 1901 Landings Drive Mountain View, CA 94043 (415) 962-8910	$195											■										
WOSBase WOS Data Systems, Inc. 455 Austin Colby, KS 67701 (913) 462-7581	$495		■	■	■								■	■	■							
1stPORT DeskTop Software Corporation, Inc, 244 Wall Street Princeton, NJ 08540 (609) 924-7111	$95						■	■	■								■	■	■			4,5,7

1. When using a word-processing program, you can add many different ASCII delimiters.
2. When you use an integrated program, data transportability will vary between modul within the program.
3. MacLion can import and export SYLK files. You must write to the company for this option.
4. Programs that can communicate in a binary fashion can transfer any file type, but the receiving programs cannot necessarily manipulate the data subsequently.
5. The product can change the data into different formats.
6. The database requires a Tab delimiter between fields and a Return between records.
7. 1stPORT can import or export a proprietary file called a flat file. This program converts a data file into an ASCII file with fixed record lengths similar to a sequential file.
8. MacLink can import or export WordStar, Multimate, and Display Write III files to and from MacWrite files. It converts all the special formatting within each program.
9. Helix can now import or export user-defined files.
10. Crunch can import WKS and DIF files, as of late 1985.

AppleWorks™

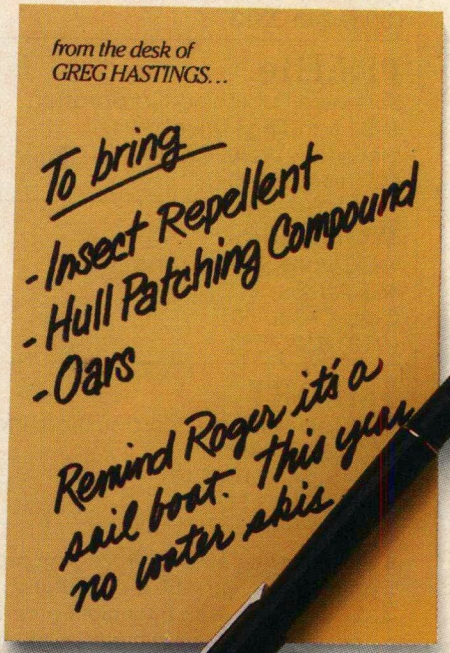


Only Pinpoint adds pictures to any AppleWorks document. So you can create party invitations that are truly exciting. Even if the weather isn't.

Don't spend hours addressing envelopes and misspelling names. Pinpoint picks up names and addresses from invitations (or any documents) and drops them, letter perfect, onto envelopes. Even if you don't always spell those tongue-twisting names right, at least you'll be consistent.

One glance and you can see your social schedule for months ahead. So it's a snap to slip this year's party in between the garlic festival and your breakdancing lessons.

Jot down important thoughts whenever they strike. The note pad is perfect for reminding you of things you can't do without. Or things you can.



Impress a friend with a personal invitation. It's easy. The automatic dialer finds phone numbers displayed anywhere on the screen, not just in special files.

And it re-dials busy numbers automatically. So you're next in line as soon as your friend's broker hangs up.

Accessories. $69.

Nine accessories to be precise. And in no time, they'll be so much a part of your AppleWorks routine, you'll think of them as built-in, not added-on. Why?

For openers, these handy desktop timesavers "pop-up" via windows from inside AppleWorks *(and most other ProDOS programs)*. So you can stop what you're doing to jot down a note, address a letter, or call a friend.

You can even figure out some figures with our calculator. Tap data bases or other computers through our communications window. Even whip out short memos, forms and labels with our line-at-a-time typewriter. And then continue AppleWorks without missing a beat. Or a byte.

What's more, Pinpoint's as easy to use as AppleWorks itself. Same commands. Same hardware.

Plus you can boost Pinpoint's performance by adding an Apple Enhanced Memory Card, the new, high-capacity UniDisk 3.5 floppy, a hard disk, a modem, or one of many popular printers. And, with our Pinpoint Toolkit, you can even add desktop accessories of your own.

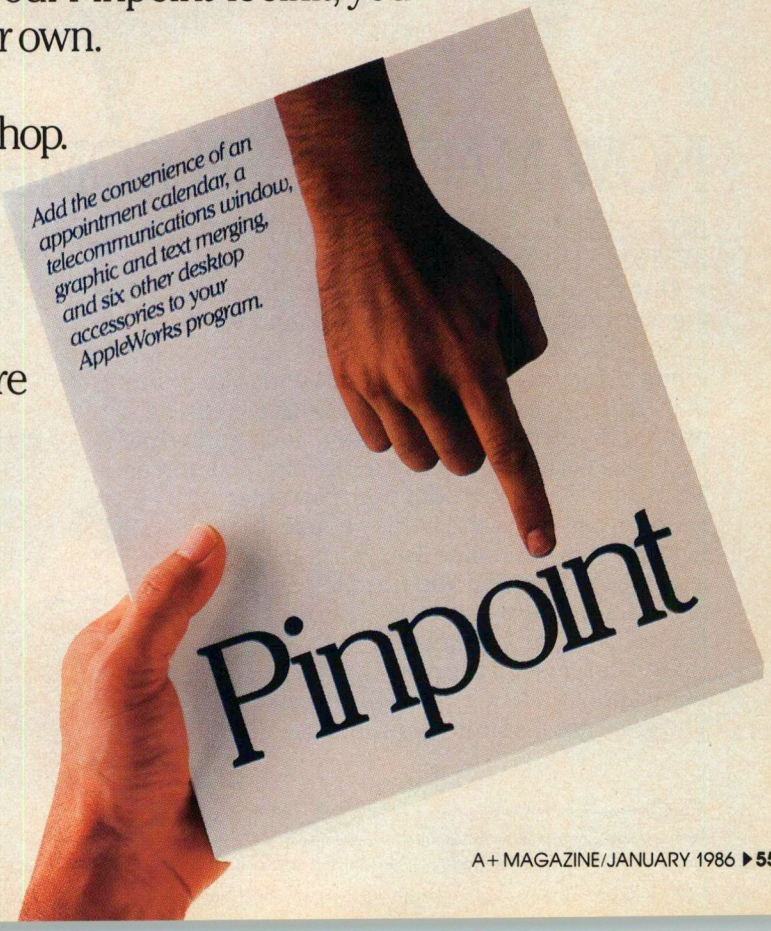
Want more?

Then visit your local computer shop.

Or call (415) 530-1726 for a dealer near you. *(Dealers. Please call First Software (800) 343-1290 or Softsel (800) 645-7778.)*

You'll see that Pinpoint does more than give AppleWorks a handful of accessories.

It gives AppleWorks the works.



CIRCLE 192 ON READER SERVICE CARD

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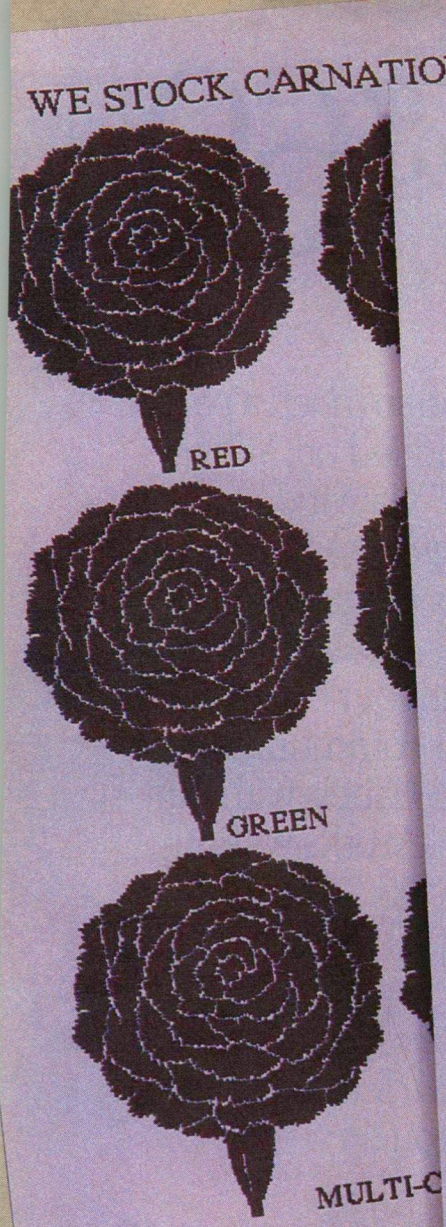

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But now your images don't have to stay black and white. Any image or text created with MacPaint,™ MacWrite™ or other Macintosh software can be printed in eight colors including black and white. All it takes is the new NEC Colormate™ kit and an NEC Color Pinwriter™ dot matrix printer.

Colormate software is easy to use. In fact it works much like MacPaint. It includes everything you need to connect an NEC Color Pinwriter or Pinwriter printer including a cable.

And color is not the only bright thing about an NEC Color Pinwriter. The graphics resolution is superior to the Imagewriter™ and just about every other dot matrix printer in the world. And it prints in three different speeds and in 8 different type styles.

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C&C Computers and Communications

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A Glossary of Terms

BY STEVE ROSENTHAL

AppleWords

For use with our preceding cover stories (pages 30–53).

ASCII FILE
A file containing only text characters and the simple formatting-control characters of the ASCII (American Standard Code for Information Interchange) code set. ASCII files, including the Text files on the Apple II or Text Only on the Macintosh, are easy to ship to another type of computer but do not carry the complex formatting information that is often needed for further processing or fancy output.

ASYNCHRONOUS
The type of data communication the Apple II, Macintosh, and most other personal computers use. With this method, both ends of the conversation must be set to the same transmission speed, but they don't have to use a common clock signal to keep in perfect step. When very large amounts of information must be exchanged regularly over communications links, you can add synchronous communications hardware, which exchanges information more efficiently.

BACKBONE NETWORK
A fast, high-capacity network used to link more than one local-area network. Apple is currently developing methods to allow exchange of files and programs between AppleTalk systems over backbone networks, but so far the protocols (the rules) for those transfers have not yet been announced.

BITS PER SECOND
A measure of how fast a data link transmits information. Most over-the-phone exchanges take place at 300 to 2400 bps, and direct connection can run at many thousands of bits per second. AppleTalk can ship files between computers at about 600,000 bps, which makes it slower than networks that run at megabits per second but much faster than most telephone connections.

CHECKSUM
A simple method of error checking that some file-exchange software uses to see that the data received is the same as the data sent. Although not as secure as CRC methods (see below), checksums do catch most random transmission errors.

CRC
An abbreviation for cyclic-redundancy check, a method of testing whether transmitted data contains errors. File-exchange methods that use a CRC-checking method provide a very good measure of assurance that the received file is the same as the sent file.

DB-25 CONNECTOR
The standard connector of the Apple II, II Plus, and IIe for serial data connection. It contains two rows of 12 and 13 pins in a trapezoidal shell. For most connections between Apples and modems or other computers, only 3 to 6 of those 25 pins need be connected, since the regulation of the data flow is usually the province of software instead of control lines.

DB-9
The type of connector used on the Apple IIc and Mac for hooking up serial connections to modems, other computers, and sometimes to printers and in networks. Like the DB-25 connector long popular on other types of desktop computers, the DB-9 has two rows of pins or sockets in a trapezoidal shell (on the DB-9, the rows have 4 and 5 pins instead of the DB-25's 12 and 13). DB-9s are becoming increasingly popular for personal computers, because most do not need or use the complex set of control lines and secondary channels that take up most of the pins on the DB-25.

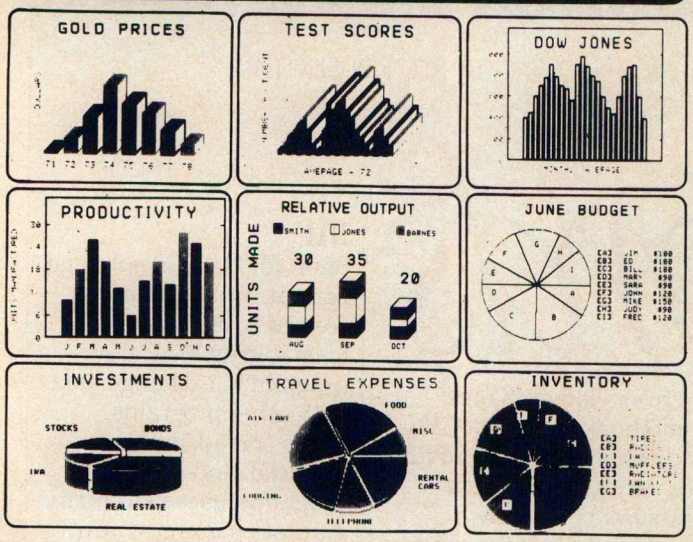
DIF
Short for Data Interchange Format, a file format created by Software Arts to enable its VisiCalc program to exchange data with other programs. Many spreadsheet, financial, and database programs, as well as many graphics packages, now read and write DIF files as one way of exchanging information with other programs and machines.

DISKSERVER
A computer system or specialized unit that provides disk storage for multiple computers on a network. The disk space is usually allocated in sections, so users cannot access information stored by other people or by people using other types of computers. Diskservers are easier to build than fileservers (discussed below), because the use of separate data areas makes it easier to keep files straight.

FILESERVER
A computer, disk system, or other type of storage device that saves and retrieves files for other computers on a network. Unlike simpler diskservers, fileservers allow files from various computers on the network to use the same regions of the disk and let authorized users at one computer read files left by other computers and even other types of computers.

MODEM7 PROTOCOL
An extension of the XMODEM protocol (see below) that allows groups of files to be transferred as

AlphaChart!



Don't pay more for less! The pictures shown above are examples of charts created with AlphaChart!, perhaps the most powerful and friendly Apple II chart program on the market. Within seconds, keyboard-entered data can be converted into picture-perfect pie or bar charts, in 26 user-selectable styles, automatically scaled and labelled, and in color or black and white. And if you want to customize your charts by adding extra artwork or text, or display them in a slide show, AlphaChart! comes with these valuable extras.....

A **slide projector,** for orchestrating automated, stand-alone screen presentations of a series of charts, timed and sequenced by the user. This program alone is worth the cost of the disk. It can be used with any graphics files created with any program.

A **graphics editor,** for alteration and embellishment of charts. Besides standard point-by-point sketching, built-in structures permit push-button creation of cirlces, rectangles, lines, shape-table shapes, and exotic woven plaid patterns. If you wish to add clarifying text to the charts, you may type on the screen in several different letter font styles. For the artist, the graphics editor can also be used to sketch any imaginable scene from scratch.

A **shape table editor,** for creating special shapes for your charts. These shapes can also be used for animation in your programs! A sample animation program shows how to do it.

AlphaChart! includes a screen-dump program for printing your charts on paper. AlphaChart! is more! Just read what these people have to say about it...

"I noticed the advertisements for Spectral Graphics' AlphaChart! program and figured that, with a money-back guarantee, I would try it. Boy, am I glad I did! This is a fantastic program. You can master its many varied capabilities in less time that it would take to describe them. I would recommend it to everyone, even if you have absolutely no need for a graphing program. It's just fun to play with." **S.A. Smith, San Bernadino, Calif... letter to SOFTALK, June, 1984, page 14.**

"The software does much more than the advertisement suggests. Without question, this is among the best buys in software that I have ever come across, and certainly among the best written. It is extraordinarily easy to use, very well thought out, and priced to kill your competition (which I wish you every success in doing)." **Anthony J. Scriffignano, North Caldwell, New Jersey.**

"I have long been distressed by the lack of software available in the scientific academic community. At last there is a simple yet robust graphics program applicable for our purposes: AlphaChart!, by Spectral Graphics Software. Business folks and scientists alike will really appreciate how user-friendly it is; I was able to produce my first three-dimensional, multi-colored, labeled bar graph within five minutes of booting the disk–without reading my documentation. I would have had to pay a scientific illustrator much more than the whole program costs just to produce that one graph....you can't do without this gem." **John B. Iverson, Richmond, Indiana...letter to SOFTALK, April, 1984, page 23.**

ONLY $29.95 Apple II+/IIe/IIc. Satisfaction guarantee or your money back (really!). Send a check or purchase order to **SPECTRAL GRAPHICS SOFTWARE,** 6333 Pacific Avenue, Suite 256, Stockton, California 95207.

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part of a single exchange. This feature is common in communications packages running under Apple CP/M but less common in other Apple communications software that includes XMODEM.

NULL MODEM

A small connection box for hooking up two computers, each of which expects to be linked up through a modem. In addition to crossing the main data wires so that one computer's output is the other's input, the null modem connects the proper hardware-control lines to simulate the signals that a modem would have provided if a complete connection had been made.

PARALLEL TRANSFER

A transfer between computers using a parallel input/output port (where 8 or 16 bits are transmitted at a time over different wires), rather than a serial port. Apple computers don't normally use this type of transfer, because they rarely have parallel input ports, and many of the parallel output ports meant primarily for driving printers transmit only seven bits at a time.

PARTITION

A region on a disk dedicated to the use of one operating system or, for a network system, one user. Although developing a partitioned disk is easier, it makes file exchange harder than when an entire disk is shared as a single common-use area.

PROTOCOL TRANSFER

A transfer of data that uses an error-checking method to insure that the data is correctly received, and software techniques to regulate the rate at which blocks of data are transmitted (flow control). Except for simple transfers of text files, all transfers between different types of machines are normally made by means of protocol transfers.

SERIAL TRANSFER

A transfer of programs or files using the serial (RS-232) port. This is the normal method for transferring files between computers that can't read each other's disks. Both the Apple II family and the Macintosh have many programs for performing serial transfers, either to specific machines (with a mating package on the other end) or as part of a general communications package.

SYLK

A type of file format developed by Microsoft to exchange information between different types of programs and computers. SYLK (short for *symbolic link*) files can be transmitted like text files, but they also contain formatting and positioning information. Many Apple II and Macintosh spreadsheet programs, graphics packages, and database managers receive or transmit SYLK files.

XMODEM

A protocol for transferring files between computers that includes error checking and pacing. XMODEM is included in most popular communications packages for virtually every type of desktop computer, so it is the most common means of sending nontext files between computers of different types. +

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Use the program's built-in formats to compose and create storybooks, folding toys, stand-up towns, greeting cards, and more. A friendly, versatile print dump program, *Stickybear Printer* supports the new Apple Scribe™ and Imagewriter™ II color printers as well as most popular printers, including the Apple Scribe and Imagewriter II with black ribbon, C. Itoh Prowriter, Epson FX 80, and Okidata 82, 92.

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Weekly Reader Family Software

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*Available for use with Apple II computers.

A/MS47-2

CIRCLE 350 ON READER SERVICE CARD

How to GET What You PAY FOR

You won't get a warranty on your computer purchases unless you clarify your expectations.

Computers and software are generally sold on the assumption that sellers and buyers know what the buyers want. This assumption is seldom valid. All too often, the sellers' main goal is to turn a sale, whereas buyers, especially if they are new to computers, often have little idea of what to expect for the hundreds or—more often—thousands of dollars they're spending for a few small pieces of plastic and/or silicon. Simply put, many computer-related sales occur despite a serious lack of mutual understanding.

In fact, consumers have very little recourse under the circumstances I've just described. The laws of most states allow sellers to run away from, rather than stand behind, their products, and federal law governing consumer warranties is also easy to circumvent. As long as the terms of the overall sales transaction are sufficiently vague, the courts usually hesitate to step in.

This absence of customer recourse may be immediately gratifying to sellers who want to avoid lawsuits, but, in the long run, it is detrimental both to consumers and the computer industry. No business can survive long with a sales philosophy that is basically unfair to its customers. If consumers and sellers both take a little care, however, retailers will have happier customers, and dissatisfied consumers will have reasonable recourse if a seller fails to promptly bridge the gap between expectation and performance.

Defining Objectives

For inexpensive software items and home computers designed primarily for games, the approach I suggest in this article may not be completely appropriate or necessary. On the other hand, a product that costs only several hundred dollars should still do what you reasonably expect it to, and some of my suggestions might prove generally valuable.

To put the problems inherent in purchasing computers and most software into the proper perspective, consider what happens when you buy a new car. All parties to the transaction know more or less how the car is supposed to perform.

It should start; get the driver from point A to point B in relative comfort; be operable in the rain, cold, and wind; work properly without any extra attachments or add-ons; attain certain speeds and gas mileage; have workable seat belts; and generally hold together for a reasonable length of time. A customer can check out many of these assumptions in a road test, and the automobile companies spend millions of advertising dollars claiming that each offers the most comprehensive and long-lasting warranty protection.

Cut now to typical computer-product transactions. Computer customers normally spring for their computer-related purchases (whether for a complete system, hardware only, or a piece of ready-made or customized software) knowing only that the items are supposed to help achieve certain broad objectives (e.g., a more efficient business-accounting system, accurate economic forecasting, effective word processing, or reliable external communications). Exactly how the items will function to achieve these objectives is often unclear in the buyer's mind. Warranties are generally nonexistent, and there is no real-life "test-drive equivalent."

At this point, something I can describe only as an act of consumer faith takes over. Simply put, buyers choose to believe that the computer or software will accomplish whatever they dream it will do. The common result of this faith approach has been well documented. Once the machine and/or software are installed, they rarely perform the expected miracles. To put the problem more directly, the hopeless bookkeeping system remains messed up, the business doesn't grow as fast as the spreadsheet said it would, the word-processing software

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THE X-10 POWERHOUSE DOES EVERYTHING BUT PUT OUT THE CAT.

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THE X-10 POWERHOUSE INTERFACES WITH YOUR APPLE TO CONTROL YOUR HOME...FOR SECURITY, COMFORT AND ENERGY SAVINGS.

This remarkable Interface lets you run your home through your Apple IIe or IIc and a mouse, keyboard or joystick.

When you're away, it makes your home look and sound lived in. When you're home, it can turn off the TV at night and wake you up to stereo and fresh brewed coffee in the morning. It can even turn on your air conditioner and control your heating.

SPECIAL COLOR GRAPHICS MAKE PROGRAMMING A SNAP. You simply pick a room from the display screen. Use your mouse, joystick or keyboard to position graphics of lights or appliances. Then follow on-screen instructions to program any light or appliance to go on or off whenever you choose. You can even control thermostats, light intensity and more.

THE WAY IT WORKS. The X-10 Powerhouse Interface is cable-connected to the Apple RS-232 port and plugged into a standard 110V outlet. After it is programmed, the Interface sends digitally encoded signals through your home wiring to special X-10 Modules. To control a lamp or appliance, you simply plug the electrical device into a Module and then plug the Module

into an outlet. The Interface can control up to 256 Modules throughout your home and won't interfere with normal use of lights and appliances.
There are plug-in Appliance Modules, Lamp Modules, Wall Switch Replacement Modules and Special 220V Modules for heavy duty appliances such as water heaters and room air conditioners. Plus Thermostat Controllers for central heating and air conditioning, Telephone Responders to control your home from any phone, and much more.

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CIRCLE 347 ON READER SERVICE CARD

refuses to place footnotes accurately, the modem software is unable to transfer files in the proper format, and so on.

Once the awful truth strikes home, disappointed consumers are likely to complain to the person who sold the product. The "remedies" that sellers most often suggest are the purchase of additional hardware or software products, the customizing of existing software, and expensive training courses. These palliatives are unacceptable to many customers. The first question then becomes: What recourse do they have? The second: What recourse should they have?

Let's start with a basic legal proposition crucial to the rest of this discussion. First, although consumers have no abstract legal right to be satisfied with any particular purchase, all consumers do have the right to receive what they pay for. For example, if people purchase bread, they have a right to receive bread, not crackers.

In this context, computer-related products (and most other consumer products, for that matter) are purchased under a sales contract (often spread among several documents) that covers such items as the price, discount, installment payments, terms of delivery, installation, and who is to be held responsible in case things don't succeed as planned.

If the contractual terms are clear (as in the bread example) and the customer in fact does not receive what he paid for, basic contract law in all states requires the seller to honor the contract or pay the customer appropriate damages. If, on the other hand, the contract is not at all clear in terms of what the customer is supposed to get, then the consumer has few legal means to compel performance.

Unclear contracts are the main problem in computer-related purchases. Customers get a computer and/or software, all right, but because little or no effort has gone into documenting what the hardware and software are supposed to accomplish, they could just as well have received a vacuum cleaner.

What happens, however, if a seller makes written or oral statements to a consumer about the marvelous things a computer or certain software can accomplish? Under a law known as the Uniform Commercial Code (U.C.C.), adopted by all states except Louisiana, such statements (called express warranties) must be honored unless the buyer and seller agree to the contrary. As we will see, such agreements to the contrary are almost universal practice in the computer-retailing industry.

Existing federal and state laws give computer consumers little or no protection.

The U.C.C. also provides that any contract for the sale of consumer goods contains implied warranties that the goods will function as that type of product should (e.g., a computer package will function like a computer package) and that the goods will specifically function in the way the customer intends to use them, assuming the customer made this information available to the seller (e.g., if a computer customer tells the seller of his need for a word-processing program that easily makes footnotes, the program that is sold must be able to do this).

As is the case with express warranties, the buyer and seller typically agree that these implied warranties don't apply.

"Wait a minute," the customer may say. "I never agreed to anything; I was simply handed this 'contract' as part of the deal. Nobody ever asked me whether I agreed to it." Well, unfortunately, when customers pay for and accept delivery of an item, the law has traditionally deemed that they have agreed to the conditions that are stated by the seller in the sales contract.

Disclaimers and Limits

As it turns out, the sales contract in a computer-product transaction typically contains broad disclaimers of any implied warranties, an absence of written warranties, a statement that attempts to rule out representations made in the course of the sale, and a statement limiting the liability of the seller for any damage or loss that may result from the product's use. So, except in Mississippi, Massachusetts, West Virginia, Kansas, Maryland, Vermont, and Maine, where laws prohibit or greatly restrict a seller's ability to make these kinds of disclaimers, the customer and seller in a computer-related sales transaction have no meaningful warranty protection under the U.C.C.

The Federal Case

So far I have discussed the plight of the consumer under general state contract law and the U.C.C. as adopted in each state. A federal statute (the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act) does exist that attempts to regulate warranties on goods intended primarily for personal or household use. Under this law, a seller may not disclaim the warranties implied to exist under the U.C.C. if any kind of warranty is written in the course of the sale.

This statute has proved to have an effect opposite to what its authors intended. Instead of making written warranties and living with implied warranties, sellers of computer-related products make no written warranties and disclaim all implied warranties (except in the states where this practice is prohibited). Customers can usually avoid this melancholy result only if they buy an extended service contract, in which case the implied warranties stand.

There is some possibility that courts may refuse to uphold the worst of the warranty disclaimers in cases in which consumers who are not technically oriented have made expensive computer purchases. This possibility exists because, under the principles of general contract law, a contractual provision may be unenforceable if

- The parties did not mutually agree to its basic provisions,
- extreme unfairness was involved in the way the contract was formed,
- society has determined that the particular kind of contract or provision should be outlawed, or
- it would be extremely unfair to enforce the contract under present circumstances.

Concisely put, contractual provisions are generally enforceable unless it seems just plain wrong to do so. Some courts now appear willing to strike down some implied-warranty disclaimers on these grounds. To what extent we'll see a new trend remains to be seen, however.

Get the Law on Your Side

If the foregoing strikes you as a legal shell game, you're not alone. The result of the status quo is simple but profound. Existing federal and state laws give computer consumers little or no protection, at least in the con-

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CIRCLE 137 ON READER SERVICE CARD

text of the kind of computer-related sales I've described in this article.

As a consumer, you can get the law operating for, rather than against, you by informing sellers in writing about your requirements and securing from them a written acknowledgment that this has occurred. If you take these steps and then discover a substantial shortfall between your stated requirements and the item's performance, you may have recourse in court under a breach of contract or consumer-fraud theory. Also, the written statement of customer requirements may operate as an enforceable express warranty, especially if the store manager has initialed it. As a practical matter, most sellers will honor their commitments when brought face to face with them, rather than fight it out in court.

The recommendation that I'm making for computer customers goes double for sellers. Instead of offering an obnoxious disclaimer to buyers, sellers should make a bona fide attempt to understand buyers' requirements. By then selling the products that meet these requirements and offering a reasonable warranty, sellers should in most cases satisfy their customers and build good will accordingly.

Let's consider an example of how these suggestions might work in respect to a complex piece of business software. Suppose you are interested in obtaining an advanced accounting package for your business. First you should analyze your present system in terms of its structure. Does your business maintain a general ledger, an accounts-payable section, an accounts-receivable section, an inventory system, a method for preparing invoices, and the like?

After you figure out what you have, you should then decide how a computerized system might improve it. Perhaps it won't. Surprisingly, some smaller businesses are better off not computerizing their bookkeeping. On the other hand, suppose you want the information entered in your invoices to be posted automatically to your inventory system, your accounts-receivable ledger, your general ledger, and to a database that you want to create so you can keep track of and analyze your sales. In that event, a computer and appropriate software are essential.

Once you've engaged in this type of analysis, you will need to get a handle on the amount of data to be run through the computer, the number of people who will be using the system, your business's projected rate of growth, and so on.

Next, you should prepare a letter that

- concisely sets out the types of functions you want the computer to perform,
- contains the approximate numbers associated with these functions,
- asks what types of written warranties the store is willing to offer and what extra expense they will entail; and
- inquires whether the store can meet your needs, as expressed in the letter, or not.

Then you should either mail this letter to the computer stores in your area, along with a request for a bid, or hand-deliver it to a salesperson you encounter when you enter a store. The letter should serve as the basis for your discussions with the store personnel about which items will be best for your needs.

Once you've settled on your prospective purchase, you can ask the store manager to initial your copy of the letter. If you modify your expectations in the course of the purchase, you can amend the letter to reflect the changes. If the store manager has not read this article and refuses to initial the letter or offer you a provable assurance that the system will do for you what you specifically expect it to do, simply don't make your purchase at that particular store.

Beat the Warranty-Disclaimer Game

Computer consumers who follow this plan of action should get what they pay for and beat the warranty-disclaimer game in the bargain. Any store that encourages this sort of understanding will definitely benefit in good will. As a whole, the more the computer industry encourages consumer understanding and the more it discourages negative and paranoid approaches to retail sales, the healthier it will be. ✚

Lawyer Steve Elias is the author of the Intellectual Property Law Dictionary *(Nolo Press, 1985) and* Legal Research: How to Find and Understand the Law *(Nolo Press, 1982). He is a senior legal editor at Nolo Press, has served as legal editor of two software books, and is the developer of Nolo Press' Will Writer software.*

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CIRCLE 103 ON READER SERVICE CARD

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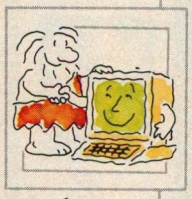

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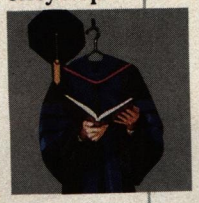

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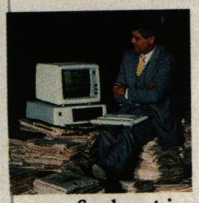

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First, relax.

There are no advanced computer skills required.

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CIRCLE 271 ON READER SERVICE CARD

SOFTWARE/BY KEN LANDIS

Finally, a check-writing program that may make itself indispensable to you.

Quicken

"Honey, I want to get a computer, it will be educational for the kids." Undoubtedly. "It will pay for itself through the tax breaks and will help me with my job." Probably. "We can use it to help manage our finances." No way!

No matter how good your intentions are for the Apple, unless you possess the fanaticism of a terrorist, you are not going to sit down with your Apple and some software every night—or even once a week—and use it to help you manage your budget. It's just too complicated. A piece of paper on the refrigerator works better, but that piece of paper can't write checks; reconcile your checkbook; or work with AppleWorks to do budgeting, what-ifs, or the like.

Enter Quicken, a program that does just that. The folks at Intuit, Quicken's publisher, had the same problems I've just outlined. They had a lot of computer power at their disposal but didn't like the software they found on the market for home and small-business finance. So they did some market research, asked a lot of people many questions, and found out what they wanted and what they didn't.

When the research was done, they sat down, wrote an exceptional piece of software, and put together a great users' guide.

But to the folks at Intuit, that wasn't enough. They got more publicity than a Band-Aid on the president's nose (did *Forbes, The New York Times,* and *Parents* magazine all cover *that* story?). So you *A+* readers aren't left in the dark, let's take a look at Quicken and see what it does.

Quicken's main job is to write checks. Sure, several programs are on the market that write checks, but none as quickly and easily as this.

Writing a check with Quicken is as straightforward as 1-2-3. 1: you boot up the program. 2: you fill in a check on the screen. 3: you print the check. That's all you have to know to use the program. But, since the de rigueur software-review style is to discuss the operation of programs at some length, let's get down to some details.

Quicken comes on one 5¼- or 3.5-inch disk. The program is on one side of the 3.5-inch disk but on both sides of the 5¼-inch disk. When you boot up Quicken with a 5¼-inch disk, you start by booting off the side of the disk with the label (standard practice), and then you turn the disk over and use the other side (not standard practice). Although this technique doesn't affect the operation of the program at all, there is considerable sentiment among engineers and computer repairmen that using disks in this fashion is akin to asking your disk drive to smoke three packs of cigarettes a day. This method costs Intuit less than providing the program on two disks, but it may result in reliability problems.

How It Does It

Quicken is easy to use, in that it is menu-driven. The main menu as well as all the other screens in the program are clean and crisp. The main menu lists the three main functions of the program: Write Checks (along with Use Check Register for entering checks the system hasn't "cut"), Balance with Bank Statement, and Transfer Data to AppleWorks (see figure 1). Also included are a Search and List feature (more on this later) and the Diskette Backup command. Each Quicken disk can hold upwards of a thousand transactions for each of your checking accounts.

When the research was done, Intuit sat down and wrote an exceptional piece of software.

So, if you have three accounts, you will need at least three diskettes. As for categories, which you enter into the Memo line of the check, you can have as many as you want. Some users can consolidate their accounts to avoid disk proliferation.

When you tell Quicken that you want to write a check, it gives you a blank one on the screen to fill in, along with your current balance (figure 2). Once you've entered the check's amount, Quicken will deduct the amount from your balance right away, so you always know how little money you really have.

ADRIAN DAY

When you fill in the check, you do most of the work, but not all of it. Quicken does a lot for you. About the first thing anybody fills in is the date. That you do alone. Next is the "Pay to the order of" line. You can do this by just typing in the information, or Quicken can help.

All of us have repetitive bills such as car payments, mortgage or rent, electric bills, and so on. Since you have to pay these bills every month, Quicken can memorize the particulars of a given bill or, for that matter, memorize any reason that causes you to write a check.

To teach Quicken, all you do is enter the information necessary to complete the check, including the amount (if it's the same every month; if not, then you can leave it blank) and the name and address of the person or business who will get the check. Press a couple of keys, and that information is stored forever or until your disk loses its magnetic properties, a time some physicists estimate to be more than 8000 years.

To recall this information, you can thumb through an alphabetical list of all the memorized checks, or partially fill in the check, which will narrow the list down considerably, and then recall the memorized checks. Either way the information automatically goes into the appropriate parts of the check.

Now comes the big one—filling in the $_____. Enter the amount of the check in the same way you would write it. For example, if my phone bill were fifty-six dollars and seventy-five cents (I wish), I would enter $56.75. If it were fifty-six, I could skip the decimal point. As soon as I press the Return key, the program spells out the amount on the next line. You enter only the numbers, and Quicken spells them out for you. If you haven't used the Memorize feature, Quicken can copy the name of the "Pay to the order of" line onto the first line of the name-and-address space. You then enter the address.

The last entry space on the check is the memo. Odds are you don't use it now, but with Quicken you should.

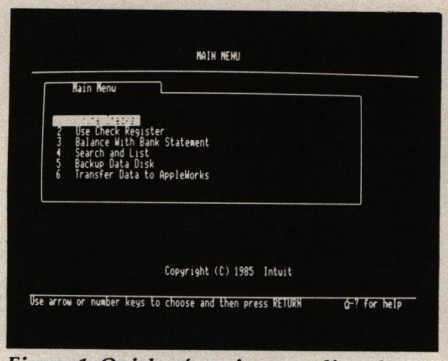

Figure 1: Quicken's main menu lists the program's major functions.

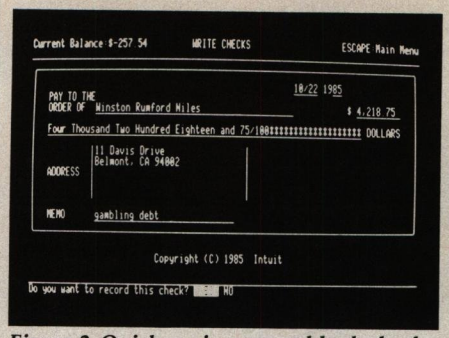

Figure 2: Quicken gives you a blank check on the screen to fill in, along with your current balance.

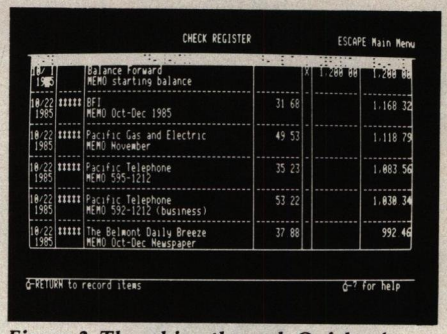

Figure 3: Thumbing through Quicken's check register lets you review the checks you've written.

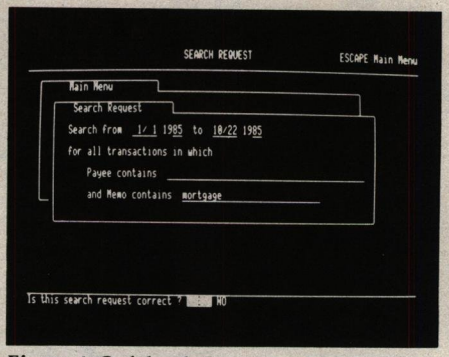

Figure 4: Quicken's Search and List feature is a simple database sort.

Why? Because Quicken uses the information in the memo to sort and sift through all the checks you write.

If you want to call up a particular category of expenditures such as your phone bills, or, when using AppleWorks, want to segment information, the memo is invaluable.

The problem with the memos is that you may not want the person who is getting the check to see your memo—say you use the memo Blood Money to identify your rent. In such a case, you have to write the check, record it in the register, and then access the register and change the transaction. It would be much easier just to enter the memo when you write the check and use a keystroke to tell Quicken not to print it.

Once the check is completely filled in, you press a couple of keys, and the program saves it to the register (figure 3). To review the checks you've written, you can thumb through the register (your thumbs are the cursor keys on your Apple).

Checks that you haven't printed appear with asterisks instead of check numbers. When you print them, the correct check number automatically replaces the asterisk.

The check register is not only for recording checks you have written, but also to record deposits, void checks, change your balance (for bank-statement corrections), and split transactions (for multiple credit-card payments, breakdown of deposits, and so on). All of these operations are very easy to do. As matter of fact, they may even be easier with Quicken than they are manually.

Finding What You Need

The Search and List feature that I mentioned earlier is nothing more than a simple database sort. You tell Quicken the dates that you are interested in, the payee's name, and the contents of the memo field. Quicken then searches through the entire account and lists all the checks that match the search (figure 4). The results look just like the check register. Instead of your calculating the amount, Quicken totals the payment and deposit columns for you.

Balancing your checkbook with Quicken is a dream. You go through your register (only the checks you haven't previously reconciled appear), marking the cleared checks and your deposits. Then you enter your ending balance. If your account balances, Quicken congratulates you. If it doesn't, it won't scold you; rather, it displays a problem screen that tallies the amount in question and what you have marked in the register. With this information, you can find a discrepancy in short order.

Quicken and AppleWorks

To do whatever else you may want to do with the information stored in the check register, you can easily transfer anything into an AppleWorks spreadsheet. The transfer mechanism is ingenious. You create the AppleWorks spreadsheet first, in any form you want. All you have to do is put the labels (names) of the information you want where you want them. Then start the transfer process. Quicken reads the labels and automatically puts the information into the spreadsheet. Bingo!

When you start AppleWorks, it's all there and working. The transfer labels are a little "computerish," but learning how to use them is much easier than rekeying all the information. Also, Quicken's keystrokes are almost identical to those in AppleWorks, so you don't have to learn two different sets of commands.

Quicken is an excellent piece of software in all respects, and, with the power of AppleWorks so readily available, it's more than good—it's indispensable.

Intuit has hit right on the mark—home and small-business checking software used to be too expensive, too hard to use, and too rigid, and it took too long to use. Quicken has changed all that. ✚

Ken Landis has been a consultant since 1978. He has published more than 100 articles on the use of computers as business or personal tools.

PRODUCT INFORMATION

Intuit
540 University Avenue, Suite 50
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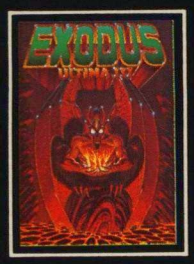

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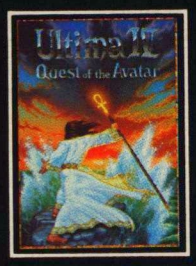

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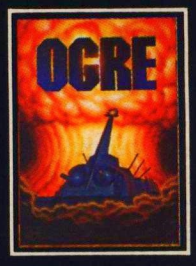

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TOOLS FOR DISABLED WORKERS

Using Apple computers, maybe with adaptive devices, handicapped people can begin to fully participate in the world of work.

APPLES AT WORK/BY LENORE CYMES WOLGELENTER

Computers have touched the lives of most of us in one way or another, offering accessibility to information tools and creating new professional opportunities and work styles. Although access to today's work world is not always simple for people who have physical limitations, the good news is that the technology that works for most of us also works for the handicapped. Computer technology has served as an equalizer, giving handicapped individuals the opportunity to compete in the workplace.

How can a blind person or someone who has cerebral palsy work with a computer? There is no one way or one piece of equipment, just as there is no one computer for all tasks. Thanks to Apple Computer's early involvement with education and third-party developers, though, Apple computers—particularly IIe's—have become prime development tools for adaptive devices.

Even so, many handicapped people have discovered it is sometimes easier to modify a workstation or an Apple computer than to modify prejudices against their participating in the office.

Help Is Near

Once the psychological barriers are down, though, employers can easily find information about specialized tools and physical arrangements to help handicapped employees. Although many handicapped people have been trained on computers (predominantly Apple IIe's) and know what adaptive tools they need, if they or their employers need more help, it's often just a phone call away.

Government databases and publications (see "Resources" at the end of this article) are easily accessible. Agencies such as NARIC (the National Rehabilitation Information Center), for example, will do a quick search through ABLEDATA and mail you a list of approximately 144 products for use with Apples. Local rehabilitation organizations can then help you solve specific problems.

Working Solutions

Suppose a new employee has complete use of his upper body but uses a wheelchair for mobility. With today's open-office architecture, employers can easily and inexpensively move partitions and install ramps. In addition, special office furniture that accommodates a wheelchair and an Apple workstation is available.

As another example, perhaps a programmer or a librarian using an on-line database has cerebral palsy and thus has limited speech and dexterity. Devices exist that eliminate the need for finger control of the keyboard. Programmers, for example, might be able to use an optical keyboard that works with a light-pen-like device. The pen sits on the user's head like a headphone and registers head movements as he or she points to a word or character on the screen. For those people who can use only their breath, a "sip and puff" device or a mouth stick might be the answer. With the appropriate control device, such individuals can often use standard off-the-shelf software and hardware.

Those who are totally blind can use adaptive tools such as an Echo+ speech synthesizer and a VersaBraille machine, which has a braille keyboard, with an Apple IIe. The Echo+ synthesizer is a plug-in board that converts ASCII text to speech and so can provide spoken output of screen commands or read entered text back to the user. The synthesizer can be used with headphones, eliminating any audio disturbance. At present, more than 300 talking programs, including software for word processing and database development, are available. One of the most popular talking word-processing programs for use with the Echo+ synthesizer and the VersaBraille machine is Braille-Edit. Although this program's files are in a nonstandard format, you can translate the files (with a little effort) into a standard file format that is compatible with AppleWorks or other popular word-processing software. Thus, sighted employees can use other software to work on files produced by blind people using Braille-Edit.

Apple computers—particularly IIe's—have become prime development tools for adaptive devices.

Case Histories

Handicapped people have found many and varied ways to use Apple computers, with or without special adaptive devices, to help them succeed professionally. Here are some brief examples:

George Covington, a lawyer, jour-

DAVID TAYLOR

Dave Taylor

A MAN WITH A MISSION

Dr. Alan Brightman, director of Apple Computer's newly created Office of Special Education Programs, has a mission—advocacy. According to Brightman, "An Apple computer confronts preconceived notions. Once a report is printed, it doesn't matter if the operator is or isn't handicapped. The computer and adaptive tools prove that handicapped people can produce. The Apple shoots down excuses for disregarding the handicapped."

Brightman's aim is to convince everyone that handicapped people are like the rest of us. He began working toward this goal when he was a student at Harvard, where his thesis focused on the needs of retarded children. Since then he has published *Like Me* and produced the TV series "Feeling Free," which introduces young people to their disabled peers. In 1981, the International Year of Disabled People, his photographic essay "Ordinary Moments" was exhibited throughout the country.

'If the handicapped is a thin market, it is one of the fattest thin markets around.'

The Special Education department was created in July 1985 as an evolution of Apple Computer, Inc.'s historic concern with education. Brightman intends it to increase advocacy, increase computer usage, and decrease the communications gap by bringing together organizations, working with government agencies, and disseminating information.

The market for products to serve the handicapped is growing. According to Brightman, "If the handicapped is a thin market, it is one of the fattest thin markets around."

nalist, and photography teacher of the severely visually impaired, is legally blind. He also works as an equal-employment-opportunity specialist for the government, where his responsibilities include writing regulations for equality in programs funded by the Department of the Interior. Covington is currently using a Macintosh to develop demographic databases that statistically evaluate national parks' accessibility and employment opportunities for the handicapped. With the Macintosh's high-resolution screen and his monocular (a small hand-held telescope-like device), he requires no additional adaptive devices or special software for his computer.

The Apple IIc, because of its light weight, was the answer for Sue Nelson. Nelson lost her sight as an adult and needed to learn new ways to communicate on paper. Her system includes an Echo+ synthesizer and a VersaBraille machine. At present, she uses her Apple IIc and VersaBraille to write up interviews she is conducting for a research project. She also teaches childhood development and uses her system to develop the curriculum and lecture notes.

Mike May has been blind since the age of three. He is now Marketing Manager for Finial Corporation, a start-up company in Sunnyvale, California. Like Nelson, May uses a VersaBraille machine and an Echo+ synthesizer with his Apple IIe. Because he has Finial's only modem, in addition to using his Apple IIe for reports and projection plans, he sends out all company telex messages in braille. In order to keep up with business trends and market research, May uses the same tools as do his sighted peers—on-line databases. If he has to do a lot of reading or scanning, however, he hires someone to read for him.

Pam Martin sits amidst office noise doing her work as the resource person and librarian for the organization Closing the Gap (see "Resources"). She is responsible for developing and maintaining an extensive product database and for disseminating information. Although Martin is deaf, her Apple IIe allows her to understand others instantly and answer their questions, utilizing her database. Prior to developing computer skills, she could not have held a position requiring immediate communication with the hearing world.

Martin is not alone in finding that Apple computers can lead to jobs in the communications field. Bruce Chamberlain met me in the lobby of Apple's corporate headquarters and gave me his card, which read: "Bruce Chamberlain, Apple Technical Expert." His job is to answer all technical questions for the marketing group. Knocking on his door to gain entry to his office does not get you an answer, though, because Chamberlain is deaf. To accommodate his handicap, he has a speaker phone and a secretary to screen his calls. If the caller has a technical question, a support person comes into his office and repeats the question so that Chamberlain can lip-read; he then answers the question via the speaker phone. Because Chamberlain had some hearing ability as a child, his speech is only mildly affected by his deafness. His main work frustration in his inability to participate fully at meetings because the conversation is too fast.

Although Martin is deaf, her Apple IIe allows her to understand others instantly.

Problems

Even though many employers and handicapped employees have found workable systems, problems can still arise because computer technology is constantly changing.

According to Greg Vanderheiden, director of the Trace Research and Development Center, Waisman Unit, at the University of Wisconsin, "The tools that make it easy for the handicapped to use computers can also eliminate them from the work force. An individual can be trained to use a particular piece of software and get on the job site to find that the supervisor wants to use another software package or computer. This type of change will once again make computers inaccessible to the handicapped."

To help counter this problem, in October 1985, Dr. Alan Brightman, director of Apple Computer's Office of Special Education Programs, participated in a conference whose focus was to work toward developing a standard port built into all comput-

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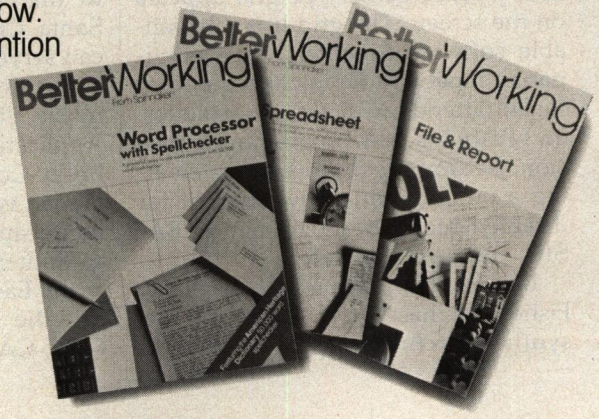

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ers, regardless of brand. This port would allow almost any keyboard emulator to mimic the electrical signals of a standard keyboard, thus "tricking" the keyboard into thinking that the impulse came from a regular keystroke.

Mike May raises another problem—more and more new software packages are relying on the use of graphics screens. The Echo+ synthesizer looks at the screen and sees a graphic design—for example, a # sign—which in code may be a number. The synthesizer "reads" that sign over and over, making it confusing to

A CUSTOMIZED SOLUTION

Three years ago an accident left Chuck Fisher of Santa Cruz, California, a C5 quadriplegic, with only limited movement in his tricep muscles. He could no longer work in a recording studio or be an electrician. When he was introduced to the Apple IIe, he saw a means to participate in the world once again. By trial and error, he created an ingenious and easy-to-use computer system that enables him to work from home doing software development.

Fisher's system includes three Apple IIe's, each with its own monitor, that are linked serially with a Corvus 20-megabyte hard-disk drive and a printer. To call up a particular software program or file, he uses a joystick or KoalaPad, with a ¼-inch wooden dowel on a leather strap that fits over his fingers. Once he is online, a video-game-type grid appears on the screen. The grid lists all available software functions, thus eliminating repetitive typing and the need for an attendant to switch diskettes. To satisfy his new programming passion, he simplified procedures, creating a programming environment for disabled people to program in C, BASIC, and machine code.

When Fisher was introduced to the Apple IIe, he saw a means to participate in the world once again.

Because his first passion is music, Fisher purchased two alphaSyntauri synthesizers (no longer available) and designed a harmonica-type instrument that utilizes alphaSyntauri software. The prototype is saw-shaped and cut to fit his left hand. Instead of using foot pedals for vibrato and pitch bending, Fisher uses a joystick attached to the right side of the instrument. The instrument is extremely sensitive to air pressure, accommodating Chuck's diminished lung capacity. He uses an IQS Spectrum Analyzer for analyzing sound and is also using it to evaluate muscle movement and perhaps increase use of his remaining active muscles.

The music system is capable of being a 48-track MIDI digital recording studio, as well as a laboratory for studying sound and acoustics.

All Fisher's equipment is housed on a specially designed hydraulic stand, cantilevered to be rolled over his bed. Although he has been the brains behind most of his system, he had help from people such as Donald Rossini, a machinist, David Warren, Professor at Cabrillo College in Aptos, California; Professor Warren White of San Jose State; and several friends who acted as his hands.

Not one to shun communicating with others, Fisher has set up a sysop information exchange, which is free to the handicapped community, in Santa Cruz, California. The system can serve up to 10,000 users. As well as writing software and composing music, Fisher also teaches Computer Applications for the Disabled at Cabrillo College and does consulting. He is very willing to assist other handicapped individuals with their computer systems and can be reached at the Easter Seal Society, Computers for the Severely Disabled, Santa Cruz, CA 95061; (408) 427-3360.

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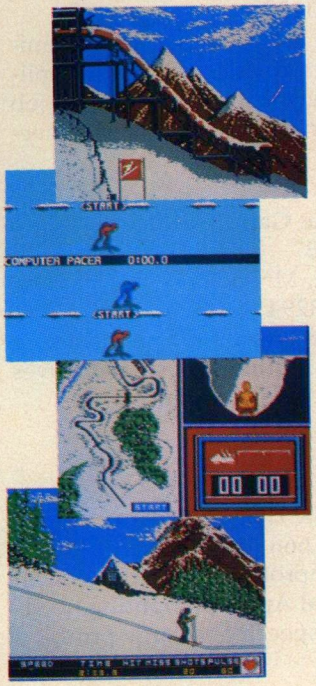

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the listener. Because most software is protected, graphics screens are hard to eliminate. May would like publishers to license their program code to specific companies so that they can eliminate the extraneous information.

Helpful Organizations

Also working toward this goal is Sherry Lowry. Lowry became involved with computers and the handicapped when her teenage son lost his sight. As a result, she has started a nonprofit corporation, SPEECH Enterprises, in Houston, Texas. One aim of this organization is to obtain conversion permission from publishers, and it is working with Brightman to reach this goal.

'Good managements will see the opportunities and expand their workers' potential, whether the employees have a handicap or not.'

Delores and Bud Hagen, like Lowry, became involved with computers and the handicapped while finding ways to help their handicapped son. In the process, they founded Closing the Gap, an organization that publishes an internationally read newspaper, sponsors conferences on computers and the handicapped, offers summer workshops on technology, and serves as a clearinghouse for microcomputer products.

Although many of these examples show how individuals have developed their own solutions, many employers are not yet familiar with the (not so quiet) technological revolution within the handicapped community. As May says, "My Apple setup lets me get my work done. The important link is the manager and how that person views people. Good managements will see the opportunities and expand their workers' potential, whether the employees have a physical handicap or not." ✚

Lenore Cymes Wolgelenter is a freelance writer and marketing-communications specialist. She was cofounder of Syntauri Corporation and senior editor at Apple Orchard *magazine.*

PRODUCT INFORMATION

VersaBraille
Telesensory Systems, Inc.
455 North Bernardo
Mountain View, CA 94943
(415) 960-0920
List Price: $6750

Echo+ Speech Synthesizer
Street Electronics
1140 Mark Avenue
Carpinteria, CA 93013
(805) 684-4593
List Price: $149.50

Braille-Edit
Raised Dot Computing, Inc.
4088 South Baldwin Street
Madison, WI 53703
(608) 257-9595
List Price: $300

Corvus 20-megabyte hard-disk drive
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2100 Corvus Drive
San Jose, CA 95124
(408) 559-7000
List Price: $2795

KoalaPad
Koala Technologies Corporation
2065 Junction Avenue
San Jose, CA 95131
(408) 946-4483
List Price: $125

IQS 401-LX Spectrum Analyzer
IQS, Inc.
12812J Garden Grove Blvd.
Garden Grove, CA 92643
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List Price: $1495

RESOURCES

To find out what is happening within the handicapped community, one of the best resources is your phone book and the local office of your state's Department of Rehabilitation. Other resources are listed here.

ABLEDATA
4407 Eighth Street NE
Washington, DC 20017
(202) 634-5822

JAN—Job Accommodation Network
U.S. Department of Labor
President's Committee on Employment for the Handicapped
Washington, DC 20036
(800) JAN-PECH

Supported by the National Institute for Handicapped Research and the Rehabilitation Services Administration, this is a free information and consulting service for businesses that want to hire handicapped people or retrain disabled employees.

NTIS—National Technical Information Service
425 13th Street NW
Washington, DC 20004
(202) 487-4600

This service produces reports related to government-sponsored research, development, and engineering and regulatory matters related to the handicapped.

SPECIALNET
11201 16th Street NW, Suite 404E
Washington, DC 20036
(202) 822-7933

Sponsored by the National Association of State Directors of Special Education, SPECIALNET has up-to-date information regarding computer applications in special-education programs.

Sensory Aids Foundation
399 Sherman Avenue, Suite 12
Palo Alto, CA 94306
(415) 329-0430

This is a nonprofit national organization that provides job-ready applicants with job listings; on-the-job support services; and training, if necessary.

Closing the Gap
P.O. Box 68
Henderson, MN 56044
(612) 248-3294

This organization publishes a newspaper six times a year and serves as a product clearinghouse.

SPEECH Enterprises
P.O. Box 7986
Houston, TX 77270
(713) 461-1666

This nonprofit organization focuses on special Apple-computing needs relating to speech and large print.

EPYX PRESENTS LUCASFILM GAMES.™ KORONIS RIFT™

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It takes all kinds to make a galaxy interesting. Like you, a *techno-scavenger.* Your kind are out to get rich scavenging Ancient technology. And now you've found the fabled Koronis Rift—the weapons testing grounds of the Ancients. The chance of a lifetime awaits you.

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But it won't be easy. The Guardians—genetically engineered mutants—stand watch over their creators' technology. And they deal swiftly and ruthlessly with characters like techno-scavengers.

But you've got a plan. If you and your trusty Science Droid can scavenge the right combination of weapons and technology—and get off the planet alive—you'll make it big. Destroy the Guardian base and you'll even be a hero! The treasures of the Ancients are yours . . . if you've got what it takes.

	C64/128	ATARI	APPLE
Koronis Rift	✓	✓	✓

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* See specially marked boxes for details. No purchase necessary. Sweepstakes ends Dec. 31, 1985. Official rules available at participating dealers.

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CIRCLE 285 ON READER SERVICE CARD

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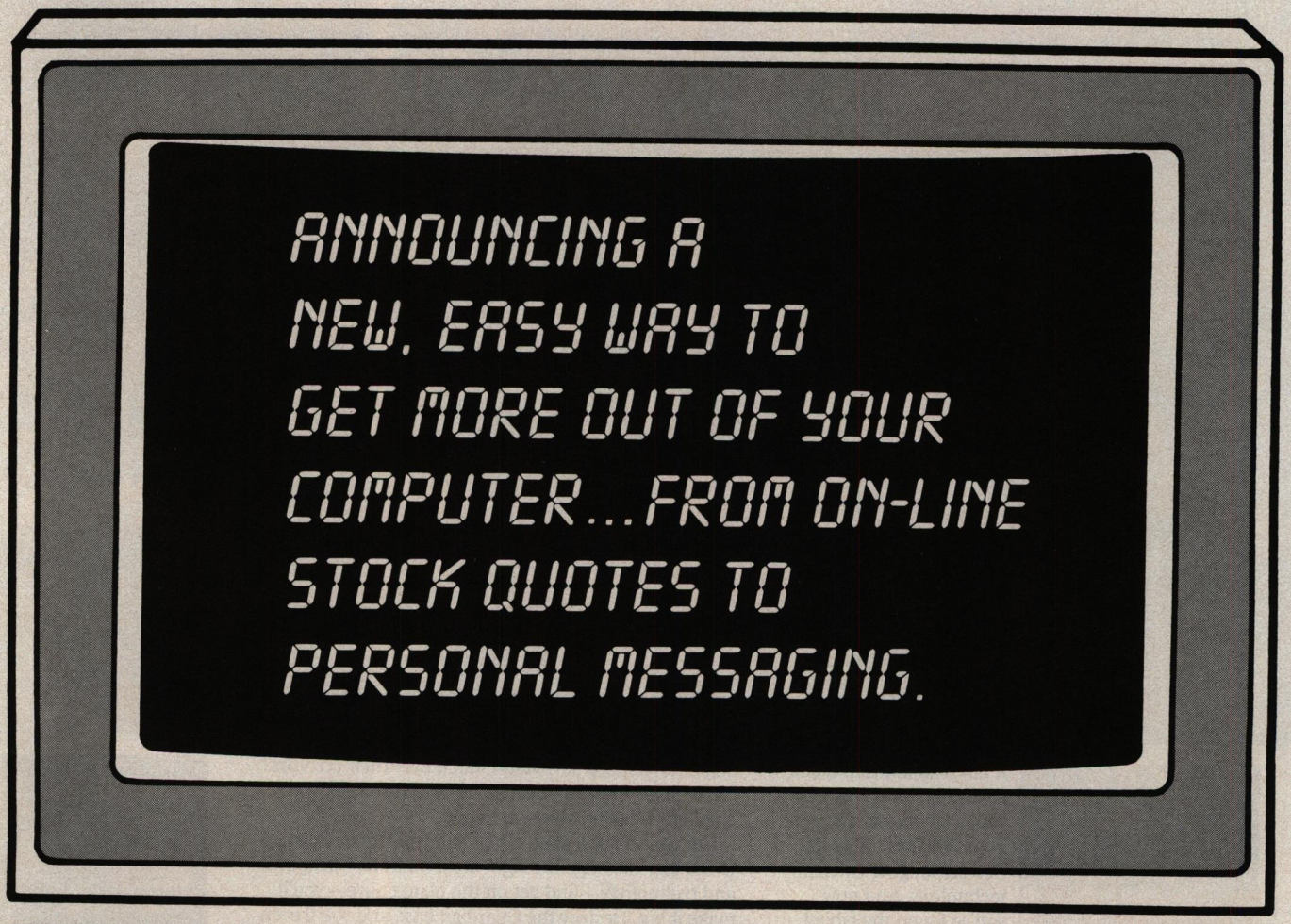

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You can access Viewtron on any of the three major communications networks at no extra charge. (A local call for most people.)

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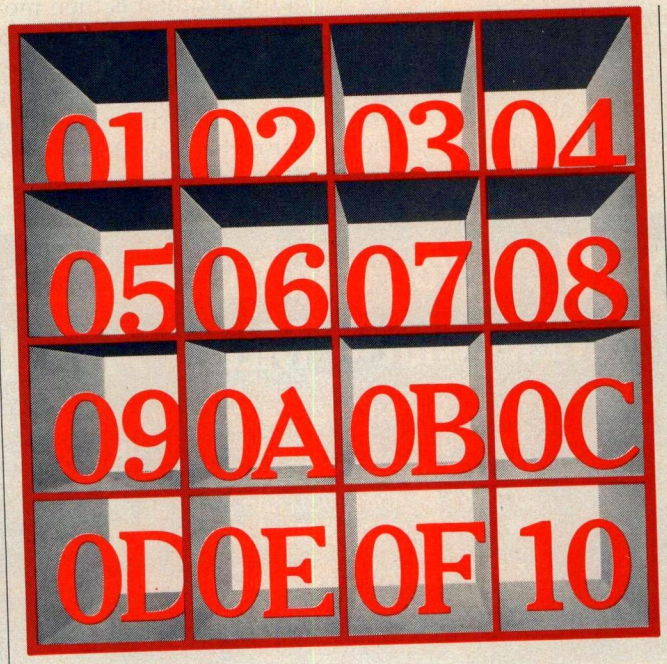
PART II Apple Machine Language for Beginners

This month A+ *magazine is presenting the second part of a two-part series on learning machine-language programming on the Apple II family of computers (see* A+ *December 1985, pages 97–107 for Part I). This series is aimed at readers with an elementary knowledge of the BASIC language, with the goal of allowing amateur programmers to make the transition from BASIC to machine language with relative ease. The series is excerpted, courtesy of COMPUTE! Publications, from the new book* Apple Machine Language for Beginners, *written by Richard Mansfield and published by COMPUTE! Publications (1985). Readers who find they enjoy learning machine language can find this book at most major bookstores.*



Reading a Machine Language Program

Before getting into an in-depth look at the *monitor*, that bridge between you and your machine's language—we should first learn how to read ML program listings. You've probably seen them often enough in magazines.

These commented, labeled, but very strange-looking programs are called *source code* (see figure 1 for an example). Source code is what you write when you want to create an ML program. It can be translated by an *assembler program* into an ML program. When you have an assembler program attack your source code, it looks at the keywords (the instructions and their arguments, and their addresses) and then POKEs a series of numbers into the computer. This series of numbers is called the *object code* and is the runnable ML program. You can CALL object code and it will do whatever you've designed it to do.

Source code usually contains a great deal of information in the form of comments which are of interest to the programmer, but which the computer ignores. It's rather like the way a BASIC program has REMarks to which the computer pays no attention.

The computer needs only a list of numbers which it can execute in order. That's what an ML program is. But for most people, lists of numbers are only slightly more understandable than Morse code. The solution is to let us use words which are then translated into numbers for the computer. The primary job of an assembler is to recognize an ML instruction. These instructions are called *mnemonics*, which means "memory aids." They are like BASIC words, except that they are always three letters long and are somewhat less like standard English.

If you type the mnemonic instruction JMP, the assembler POKEs a 76 into RAM memory. It's easier for us to remember something like JMP than the number 76. Seeing a 76, however, the computer immediately knows that it's supposed to perform a JMP. The number 76 is an *operation code*, or *opcode*, to the computer.

We write the mnemonic instruction JMP, an assem-

MICHAEL SANCHEZ

Line Number	Memory Address	Object Code	Source Code: Disassembly	Source Code: Comments
100	0300	18	CLC	CLEAR THE CARRY FLAG
110	0301	A9 02	LDA #$02	LOAD A WITH 2
120	0303	69 05	ADC #$05	ADD 5
130	0305	8D 50 03	STA $0350	STORE AT DECIMAL LOCATION 848
140	0308	60	RTS	RETURN

Figure 1: A full assembly listing

ANSWERS TO DECEMBER'S QUIZ

1. 0A	6. 20
2. 0F	7. 80
3. 05	8. 81
4. 10	9. FF
5. 11	10. FE

bler translates this into the number 76, and the computer recognizes 76 as the command JUMP. These three-letter words we use in ML programming were designed to sound like what they do. JMP does a JUMP (like a GOTO in BASIC). Deluxe assemblers also let you use labels instead of numbers. These labels can refer to individual memory locations, special values like the score in a game, or entire subroutines.

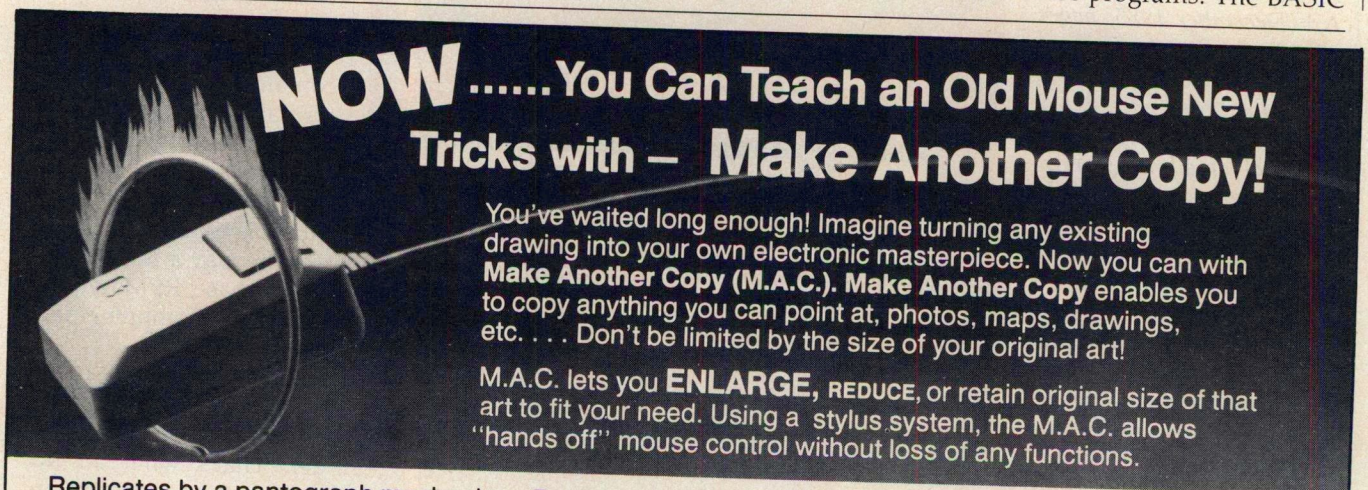
Four Ways to List a Program

Labeled, commented source code listings are the most elaborate kind of ML program representation. There are also three other kinds of ML listings. Let's see how these four styles of representing an ML program would look by using a simple example program that just adds 2 + 5 and stores the result in RAM memory location 848.

The first two styles are simply ways for you to type a program into the computer. The last two styles show you what to type in, but also illustrate what is going on in the ML program. First, let's look at the most elementary kind of ML that is found in books and magazines: the BASIC loader.

```
10 FOR ADDRESS = 768 to 776
20 READ BYTE
30 POKE ADDRESS, BYTE
40 NEXT ADDRESS
50 DATA 24,169,2,105,5,141,80,3,96
```

This is a series of decimal numbers in DATA statements which are POKEd into memory beginning at decimal address 768. This is a BASIC program. When these numbers are stashed into RAM, they form a little routine which clears the carry (so there won't be any holdover from previous addition—you always clear the carry before any addition in ML), then puts the number 2 into the *accumulator*—a special location in the computer that we'll get to later—and then adds 5. The result of the addition is then moved from the accumulator to decimal address 848. If you try this program out, you can CALL 768 to execute the ML program and then PRINT PEEK (848) and you'll see the answer: 7. BASIC loaders are convenient for magazines to publish because the user doesn't need to know anything at all about ML to enter and use these programs. The BASIC



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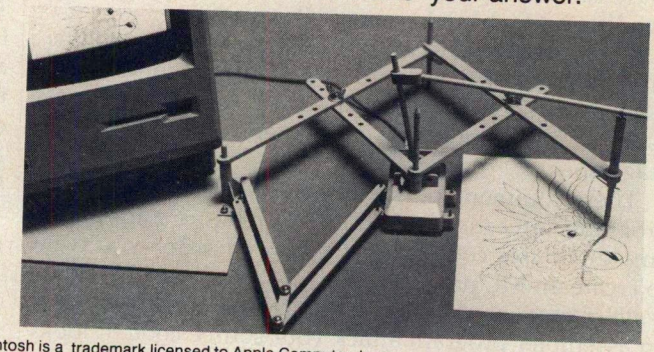

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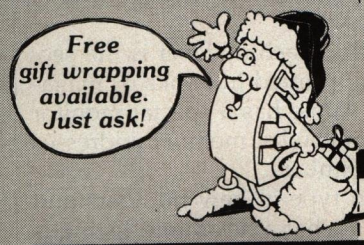

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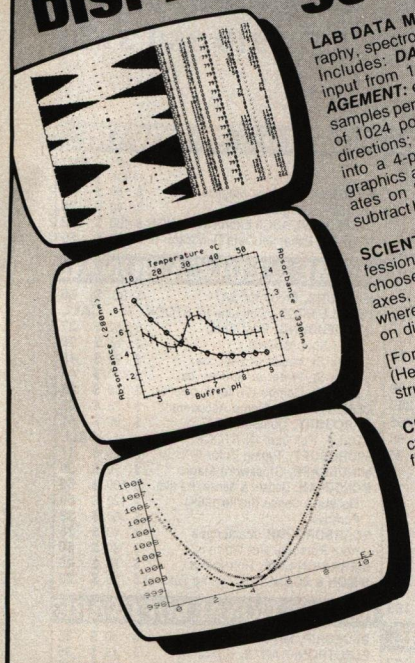

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loader POKEs the ML program into memory, and then the only thing the user has to do is CALL the right address and the ML transfers control back to BASIC when its job is done. Many ML programs end with an RTS (ReTurn from Subroutine) instruction which reverts to BASIC mode.

Getting even closer to the machine level is the second way you might see ML printed in books or magazines: the hex dump. The Apple has a special monitor program in ROM which lets you list memory addresses and their contents as hex numbers.

More than that, you can type in new numbers and change the program. That's what a hex dump listing is for. You copy its numbers into your computer's RAM by using your computer's monitor.

A hex dump, like a BASIC loader, tells you nothing about the functions or strategies employed within an ML program.

Here's the hex dump version of the same 2 + 5 addition program.

```
0300- 18 A9 02 69 05 8D 50 03
0308- 60 00 00 00 00 00 00 00
```

The third type of listing is called a *disassembly*. It's the opposite of an assembly: A program called a *disassembler* takes machine language (the series of numbers, the opcodes in the computer's memory) and translates it into the words, the mnemonics, which humans can read and understand. The instruction (the mnemonic) you use when you want to put something into the accumulator is called LDA, and you store what's in the accumulator by using an STA. In this version of our example addition routine, it's a bit clearer what's going on and how the program works. Notice that on the far left we have the memory addresses (in hex), then hex numbers representing the actual bytes of the program and, on the right, the translation into ML instructions. ADC means ADd with Carry and RTS means ReTurn from Subroutine. A disassembly is to ML what LIST is to BASIC. Your monitor has a disassembler built-in which will produce these listings:

```
.,0300 18       CLC
.,0301 A9 02    LDA #$02
.,0303 69 05    ADC #$05
.,0305 8D 50 03 STA $0350
.,0308 60       RTS
.
```

Finally, we come to that full, luxurious, commented, labeled, deluxe source code we spoke of earlier. It includes the hex dump and the disassembly, but it also has labels and comments and line numbers added to further clarify the purposes of things and to make it easier for programmers to enter and edit their programs.

On the far left are the line numbers for the convenience of the programmer when writing the source code (the program you write to feed into the assembler). The line numbers can be used the way BASIC line numbers are used: deleted, inserted, and so on. Next are the memory addresses where each individual instruction in this routine is located in RAM. Then come the hex numbers of the instructions. (So far, it resembles the traditional hex dump.) Next are the disassembled translations of the hex, but note that you can replace numbers with labels (figure 2). Last are the comments.

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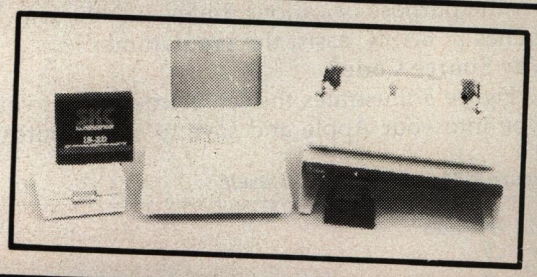

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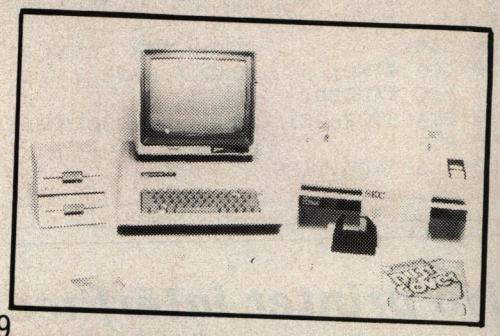

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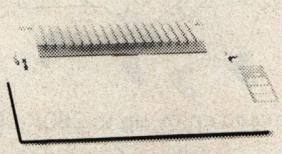

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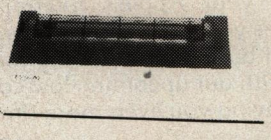

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CIRCLE 292 ON READER SERVICE CARD

```
10 0300                TWO = 2              DEFINE LABEL "TWO" AS 2
20 0300                ADDER = 5            DEFINE "ADDER" AS A 5
30 0300                STORAGE = 848        DEFINE STORAGE ADDRESS
40
100 0300 18            CLC                 CLEAR THE CARRY FLAG
110 0301 A9 02         LDA #TWO            LOAD A WITH 2
120 0303 69 05         ADC #ADDER          ADD 5
130 0305 8D 50 03      STA STORAGE         STORE AT DECIMAL LOCATION 848
140 0308 60            RTS                 RETURN
```

Figure 2: Labeled assembly

They're the same as REM statements in BASIC.

The program in figure 2 is functionally the same as in figure 1, but we've defined some labels and used them instead of numbers. That can be a good way to remember the purpose of various things, just the way variable names in BASIC assist the programmer.

The Source Code

Figure 3 illustrates the *source* code, what you would type into your Apple and save to disk. Source code is the program you write; it's what's fed to the assembler to produce object code (the runnable ML program). The object code has not yet been generated from this source code. The code has not been *assembled* yet. Once a typical assembler [see this month's "Rescue Squad" for a list of 6502 assemblers] is activated, you can save or load source code in the same way that you can save or load programs via BASIC. Once the source code is saved on disk, you could have the assembler translate the instructions and print them on the screen and/or POKE them into memory if so instructed.

Figure 3: The source code by itself

```
5 *= 768
6 .P
7 .S
10 TWO = 2;          DEFINE LABEL "TWO" AS 2
20 ADDER = 5;        DEFINE "ADDER" AS A 5
30 STORAGE = 848;    DEFINE STORAGE ADDRESS
40 ;
100 CLC;             CLEAR THE CARRY FLAG
110 LDA #TWO;        LOAD A WITH 2
120 ADC #ADDER;      ADD 5
130 STA STORAGE;     STORE AT DECIMAL LOCATION 848
140 RTS;             RETURN
150 .END ADDITION
```

Those few differences between figures 2 and 3 are conveniences for the programmer. The *= symbol tells the assembler where you want the ML program located in memory. The .P turns on the printer, and .S turns on listing to screen during assembly. The semicolons announce that a remark follows and the assembler should ignore the rest of the line, just like REM in BASIC. The .END symbol tells the assembler there are no other files on the disk which contain additional parts of this program. This is the total program.

A simpler assembler, like the one in Apple's monitor, operates differently. It translates, prints, and POKEs as soon as you hit RETURN on each line of code. You can save and load the object, but not source code, with a simple assembler. ✚

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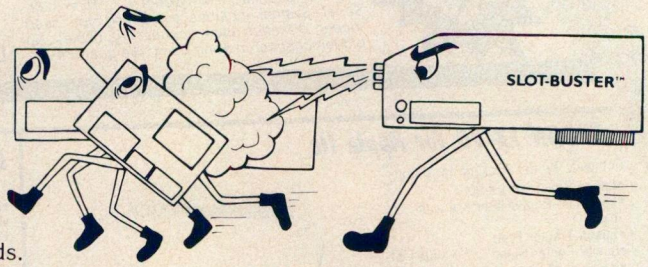

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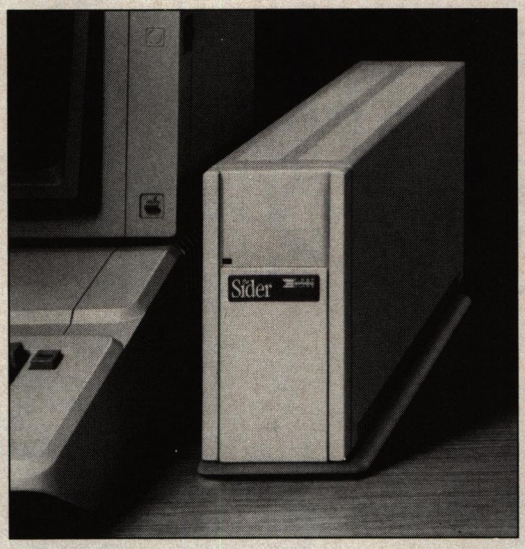

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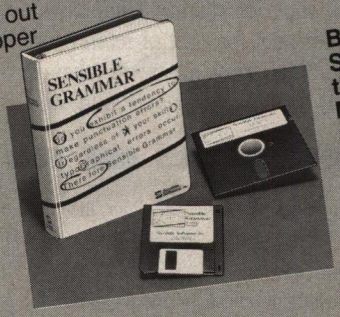

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BY ROBERTA SCHWARTZ AND MICHAEL CALLERY

A GRAPHIC NEW YEAR TO ALL

Hi-res character generators, Slide Show Magician upgrade, and Super MacPaint disk

People frequently ask us how to put text on a hi-res screen, since the four-line text window at the bottom of the screen isn't sufficient for many needs. There are alternatives. The simplest of these is to draw the letters freehand. Patience is the key here. Fortunately, most paint programs offer a text mode with a variety of typestyles. If your drawing program doesn't have the font style or size you want, you'll have to compromise.

A better option is to take your screen into a specialized program such as Fontrix to do the lettering. We use this approach because of the extraordinary variety of typestyles available, as well as the proportional spacing. Whichever of these options you choose, you'll be working with full-screen graphics.

Sometimes, however, you don't have the disk space to store full screens, or your text must change in response to user input—that's when you need a hi-res-character generator.

GETTING HI-RES CHARACTERS

A character generator is a program that puts text on the screen. The simplest hi-res-character generators use Apple shapes. Beagle Bros.' Apple Mechanic is such a program. The characters are stored in an Applesoft shape table, and you use a BASIC program to pull the correct character out of this table. Because the text characters are shapes, you can draw them in color, rotate and scale them, and place them in unusual positions on the screen.

The drawback is that hi-res-character generators can't use standard VTAB, HTAB, and PRINT statements to put text on the screen. Rather, they must use a subroutine to disassemble the text into individual characters, translate the characters into shape numbers, and then draw them on the screen. That's a lot of overhead, so the process is slow.

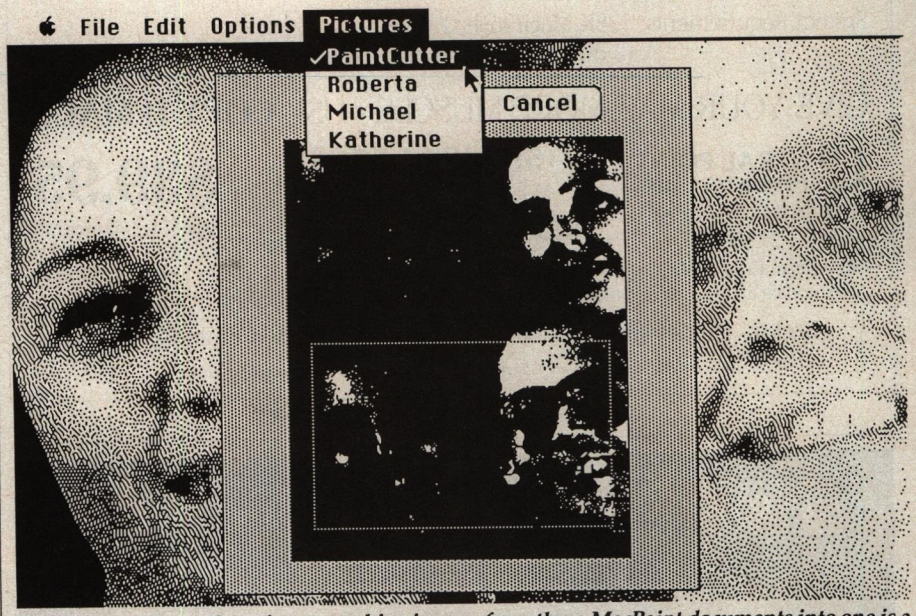

Figure 1: Cutting and pasting to combine images from three MacPaint documents into one is a snap with Paint Cutter, which also has a Show Page option.

The simplest hi-res-character generators use Apple shapes.

For many interactive applications, speed is of the essence. To achieve a speed similar to that of the standard text screen, you must turn to a machine-language character generator.

The two most commonly available dedicated hi-res text generators are HRCG from Apple and Higher Text from Ron and Daryl Adlrich. They are based on block shapes, as the standard Apple text-screen character generator is. The fonts are stored as bit maps, rather than as shapes. Once installed in your computer and activated, these programs grab characters going to the text screen and put them on the hi-res screen. You can write programs that use these characters by employing standard Applesoft VTAB, HTAB, and PRINT statements. There are some differences between HRCG and Higher Text.

Higher Text

Higher Text provides commands for printing colored text and enlarging characters. Thus, you can achieve different text styles with only one font loaded. Higher Text can produce characters that are four times the size of a normal text character, a capability that is especially useful for educational programming. The program takes

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up a large chunk of memory, and you have to relocate it above the graphics page or pages, but its benefits and features may outweigh this difficulty.

HRCG

HRCG—part of the DOS Programmer's Kit—provides a different set of features. Although it can't produce colored or large text, HRCG has commands for gluing characters together in a single block, commands that you can use to produce animation. Apple's demonstration programs, especially RIBBIT, show the power of this technique. HRCG has the further benefit of being smaller than Higher Text and relocatable. Unfortunately, neither of these character generators is currently available in a ProDOS version.

Cat Graphics and Beagle Graphics

Another way to put text on the hi-res screen is to use an Applesoft programmer's enhancement such as Cat Graphics from Penguin or Beagle Graphics from Beagle Bros. These programs add commands to Applesoft, usually through the ampersand hook. A command such as &PRINT"Hello" puts the word *Hello* on the hi-res screen. Cat Graphics comes on a double-sided disk—one side works with standard hi-res, and the flip side works with double hi-res. Beagle Graphics works with double hi-res, and it runs under ProDOS.

If all of these options seem bewildering, be grateful. This rich supply of software is what has made the Apple II so successful.

SLIDE SHOW MAGICIAN

In our last column, we mentioned an upcoming upgrade of Slide Show Magician. This excellent program, which lets you make slide-show presentations of MacPaint documents, has been made even better.

Version 1.3 can use a RAMdisk or a hard disk. Functions that previously were available only on the Edit master screen, such as Copy and Paste, and Change Frame, can now be used on any of the master screens. A significant enhancement is the addition of GoTo buttons. Place one or more of these buttons on any screen, and when you click on it with the mouse, you jump to another screen or even to another slide show—perfect for training presentations, quizzes, and other interactive uses. You can now add extra fonts with the standard Font Mover program from Apple, and the program has additional typestyles and sizes. The Special Effects screen

has a new option called Art Modes that permits you to copy one picture onto another in four different ways.

Talking Slide Shows

If we haven't whetted your appetite yet, consider that the new Slide Show Magician has sound capabilities. With an additional sound-program disk available from Slide Show Magician's maker, Magnum Software, your slide shows can use Apple Computer's Macintalk. You can also incorporate synchronized sound from a tape recorder. Using a tape-recorder sync cable, your Mac can control the tape recorder, or the tape recorder can control your Mac. A third option is digitized sound. It lets you use voices, music, or sound effects and transfer them, via a special adapter cable, from your tape recorder to a Mac port. The sounds become part of your slide-show frames. You can order all the cables from Magnum.

With Slide Show Magician 1.3, you can create dynamic presentations.

The program has other enhancements too, more than we can mention here. With Slide Show Magician 1.3, you can create dynamic professional presentations. Check it out!

SUPER MACPAINT

We've taken the utilities that we use most often with MacPaint and assembled them onto one disk that we call SuperPaint. This disk has been so useful to us that we thought you'd like to know about it. It consists of graphics applications and desk accessories. We use SuperPaint with a two-drive 512K Mac. It includes:

Switcher

Switcher allows you to have multiple applications active at the same time.

Paint Cutter

This program is one of the many excellent utilities available on Silicon Beach's Accessory Pak 1. Cutter facilitates easy manipulation of full-screen graphics. It features amenities such as cutting and pasting from one page to another without using the Clipboard, and selecting a piece of the picture larger than the Mac screen. You can move, invert, or flip your selection, regardless of its size, and do 90° rotations of selections up to eight inches high. With a 512K Mac, you can open and work interactively with four MacPaint documents (see figure 1). Paint Cutter also lets you print your graphics at half size.

Art Grabber

This desk accessory is available in Body Shop and VideoWorks, both from Hayden. Art Grabber lets you cut and paste pieces of MacPaint documents. It's like having a very large scrapbook, without all the cutting, pasting, copying, and renaming you must do to use scrapbooks effectively.

ClickArt Effects

ClickArt Effects, from T/Maker, provides four useful transformations within MacPaint. With this desktop utility, you can capture an image (or a part of it) and rotate it, slant it, stretch it, distort it, and so on.

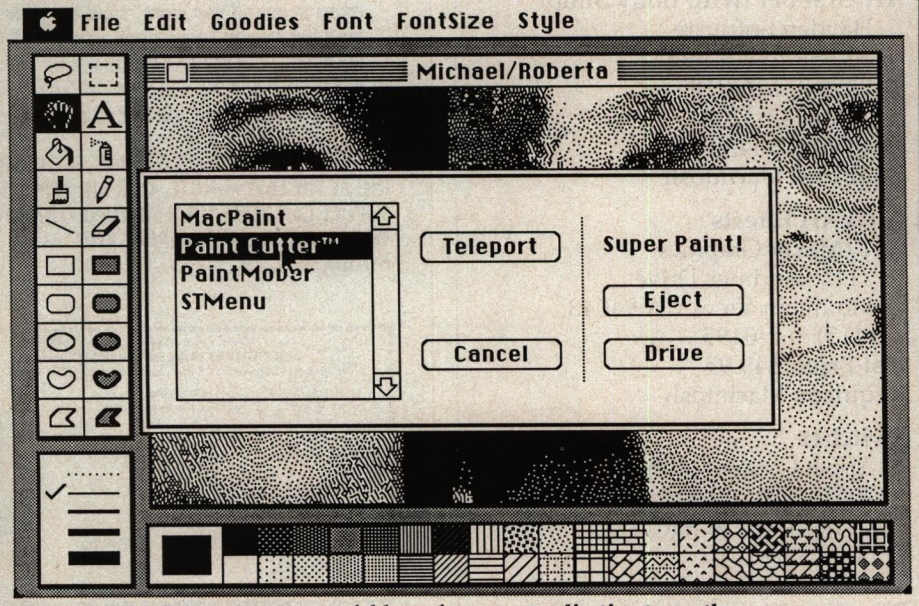

Figure 2: With Teleport you can quickly go from one application to another.

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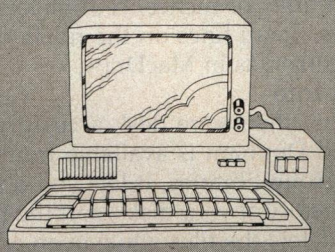

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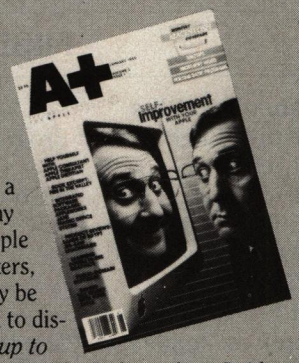

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Rulers

This desk accessory is also from Silicon Beach's Accessory Pak 1. When you activate it, the rulers frame the MacPaint window. The rulers can be in units of inches, centimeters, or pixels. Small lines on the rulers track the cursor, as in MacDraw.

Disk Info

This shareware desk accessory by David Dunham is available from users'-group libraries. It lets you obtain a directory of your disks, sort the files, and delete the files while in an application program. It also lets you switch the default volume. Because the Mac gets the Scrapbook from the default volume, you can use two Scrapbooks, one from a disk in drive 1 and the other from a disk in drive 2, without exiting to the Finder.

Teleport

Teleport, also available from users'-group libraries, permits you to launch a second application without going back to the Finder's desktop. Select Teleport from the Apple menu, and you can swiftly go back and forth from MacPaint to Paint Cutter, back to MacPaint, and so on (see figure 2).

That's it for now. Next time we'll tell you about the Magic Digitizer and Koala Vision software upgrades. ✚

Michael Callery and Roberta Schwartz are the authors and illustrators of Apple Graphics: Tools and Techniques, *published by Prentice-Hall.*

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The Slide Show Magician 1.3
Magnum Software
21115 Devonshire Street, Suite 337
Chatsworth, CA 91311
(818) 700-0510
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Requires: Macintosh (sound does not work with Macintosh XL)

HRCG (DOS Programmer's Kit)
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
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Cat Graphics
Penguin Software
P.O. Box 311
Geneva, IL 60134
(312) 232-1984
List Price: $59
Requires: Apple II, II Plus, IIe, or IIc

Fontrix 1.5
Data Transforms
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Apple Mechanic and Beagle Graphics
Beagle Bros.
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(619) 296-6400
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Paint Cutter & Ruler DA (Accessory Pak 1)
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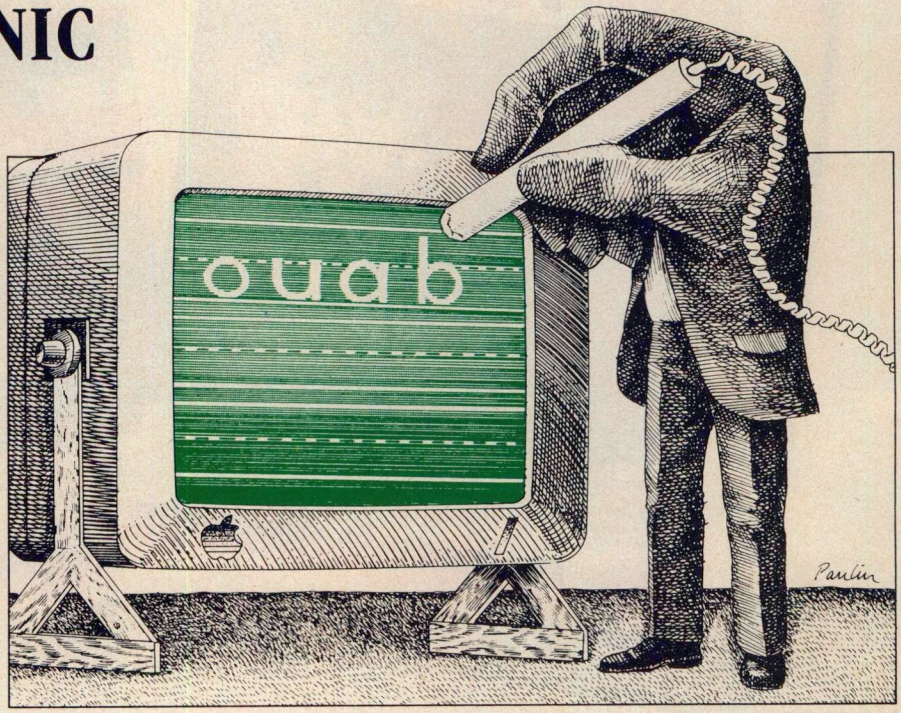
BY DAVID D. THORNBURG

THE ELECTRONIC BLACKBOARD

Authoring systems for the classrooms' Apple-II-series computers



DOUG PAULIN

For the previous two months, I have focused in my column on tools to facilitate the creation of software by educators themselves. I remain convinced that authoring systems that let teachers create programs by direct manipulation of the screen have numerous advantages over traditional programming languages such as PILOT or BASIC. Last month I showed how teachers who were fortunate enough to have a Macintosh could build instructional programs with a program called Filevision. Unfortunately, Filevision is available only on the Mac, and I'm not going to hold my breath waiting for a version for the Apple IIe or IIc.

The fact of the matter is that classrooms don't have Macs in them—at least not yet—so we need to explore some of the lesson-creation tools for the Apple-II-series computers that dominate educational computing in the K–12 arena today.

Writing on the Wall

Before looking at specific pieces of software, I want to consider one of the more powerful tools in the classroom: the blackboard. Educators at all levels have become so accustomed to having a blackboard available that they can hardly imagine teaching without one. I wonder how many teachers realize that they spend their days acting out childhood fantasies of writing on the wall!

In any case, the act of writing on a wall has important consequences for education. The blackboard is in many ways a more powerful educational tool than is the printed page. A blackboard can communicate processes as well as results—an essential characteristic of this medium that makes it a valuable educational tool. When a teacher uses a blackboard as a message system for homework assignments, the process of writing on the board is not important. The result is what students must pay attention to. On the other hand, when an instructor is showing how to multiply two two-digit numbers, the process of performing each step on the board carries more meaning than a static view of the finished computation.

The blackboard is in many ways a more powerful educational tool than is the printed page.

Given the ability of this medium to convey both process and result, it is little wonder that the blackboard is pervasive in education—quite frankly, it is a hard act to follow.

The Computer as a Blackboard

I think it's funny that, for all the years teachers have applied computers to educational purposes and for all the many millions of dollars that software developers have poured into the creation of software for this market, educational computing, in many ways, has yet to approach the power and flexibility of a teacher standing in front of a piece of black rock holding a piece of soft white rock. Sometimes we technology lovers think that teachers who don't use computers are missing the boat, but maybe they are simply reluctant to displace a perfectly adequate tool with an inferior one!

Hand of the Free, Home of the Brave

If you accept the idea that the blackboard is a powerful instructional tool, then a useful model for a com-

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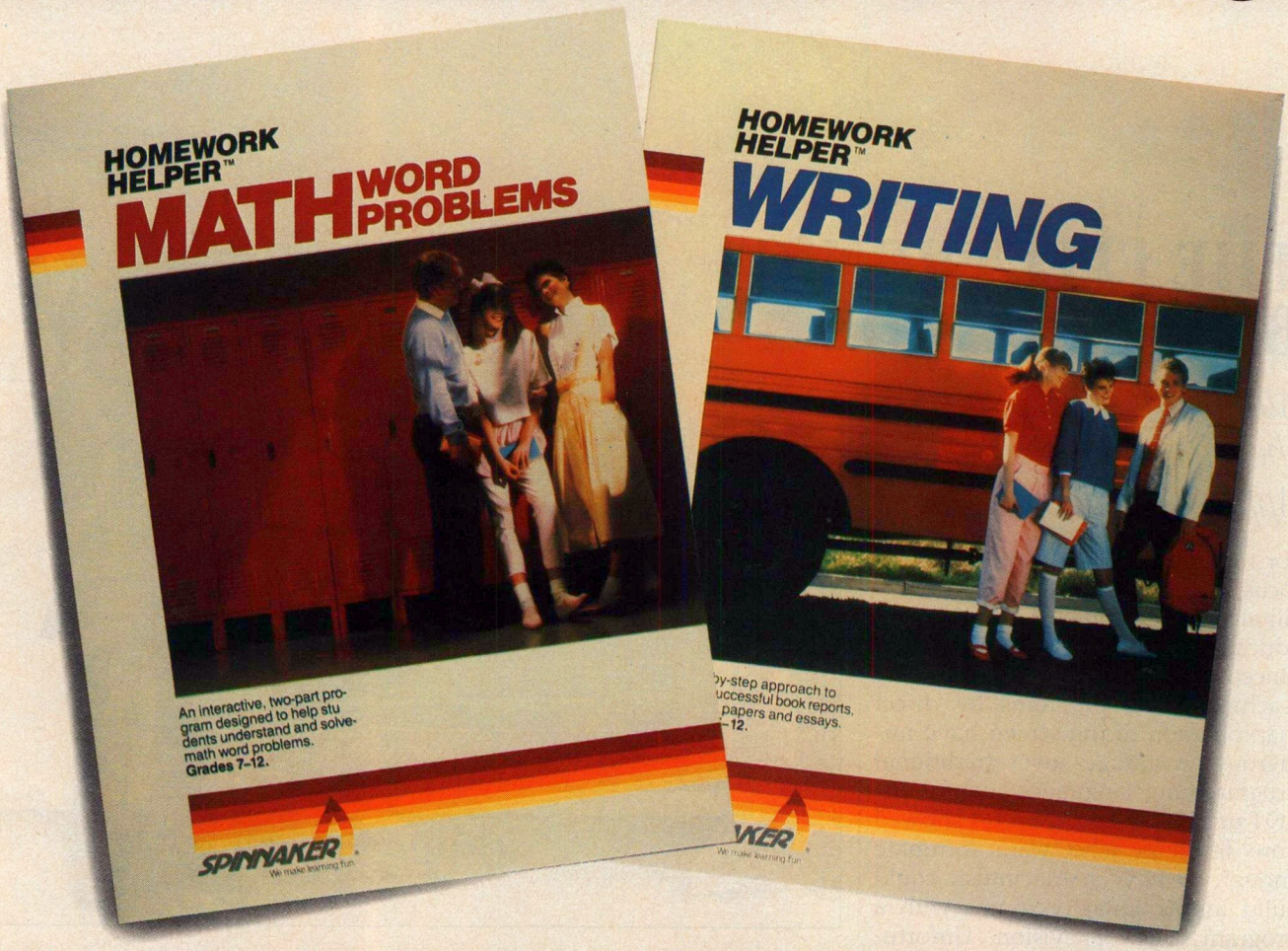

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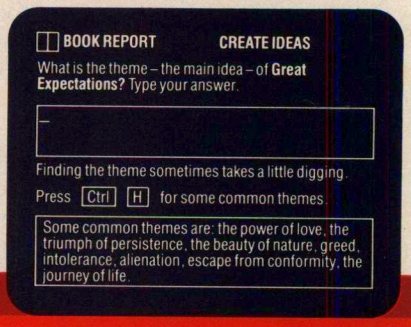

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puter-based lesson-creation system might be one that emulates the behavior of the blackboard, accepting freehand sketches and drawings. With this model, one way to use an Apple computer as an authoring system is to start with a good graphics program and a touch tablet (such as Dazzle Draw or KoalaPainter, along with a KoalaPad). You can create freehand drawings of instructional material and save them on disk, adding text to the pictures if you want to do so. You can use a slide-show program to bring each picture onto the screen in sequence.

An authoring system of this type has some advantages over a blackboard, such as the ability to use lots of color and the freedom to create pictures well ahead of time.

As useful as such a tool might be, it still pales in comparison to the blackboard when the goal is to instruct students in a process-sensitive task, such as learning how to write in cursive form. For this task, learners should see an animated picture of the strokes that generate each letter. Ideally, learners should be able to control the speed of the material's presentation and should be able to use lessons in a self-paced fashion.

Movin' Right Along

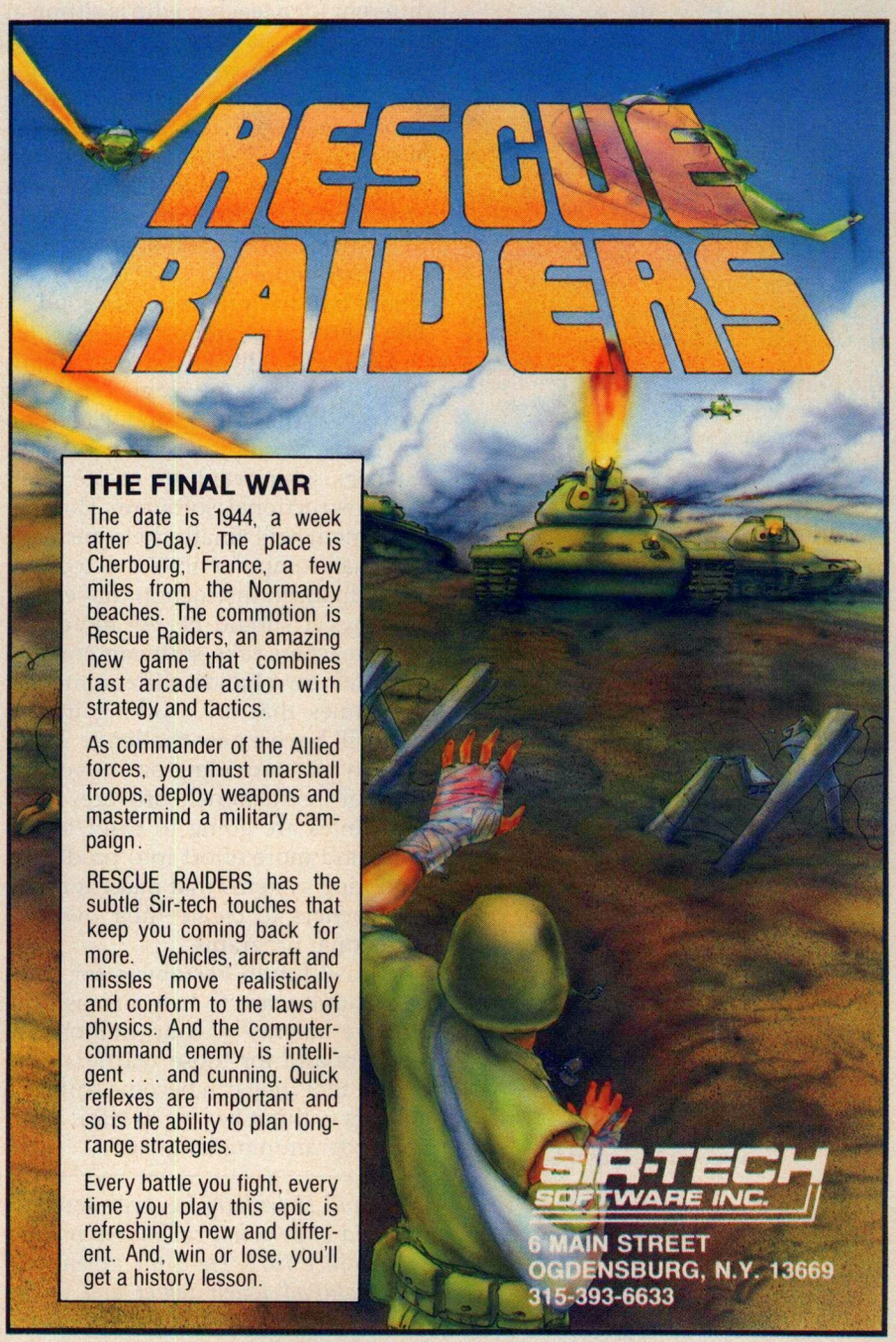
Computationally, creating such lessons seems like an easy task, and yet the necessary software has only recently come to the marketplace. The program Move-N-Write Along (available from Stokes Publishing Company, 1125 Robin Way, Sunnyvale, CA 94087) was designed by Jeb Eddy to let educators capture their process-sensitive materials in a form that would let students play them back whenever they wanted to see them.

On the surface, Move-N-Write Along is a graphics program that uses the KoalaPad to create pictures on the computer's display, but this product is different from other graphic packages in a key way. Traditional graphics programs save only the finished piece of artwork. Move-N-Write Along keeps track of each stroke as it is drawn on the screen and saves all this information for playback later.

In essence, Move-N-Write Along samples the touch tablet a certain number of times per second. When a line is being drawn, the program appends the coordinates of the pen at each sample point to a list. When you replay the image, the computer takes the coordinate values from this list, places them on the screen, and draws a line from the previous coordinate value. If a teacher draws a circle slowly for the first half and quickly for the second, this time-sensitivity will be reflected when you play the picture back. If the playback is too fast for students to understand clearly, they can adjust the speed to draw the image slowly.

In addition to providing a blank screen for drawing, Move-N-Write Along also comes with a set of grids, including special patterns for handwriting practice. The teacher is free to create pauses throughout the lesson so that a final (or intermediate) image can stay on the screen until the learner presses a key to continue. To avoid screen clutter (a real problem with the low resolution of the Apple II "high resolution" screen), the teacher can erase screens and start over in the middle of a lesson.

The limitations of this product are twofold. First, a lesson module that lasts more than a few minutes is hard



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to create, since the lists of coordinates tend to fill up the computer's memory. The solution seems to be to draw quickly and then to play the lesson back in slow motion. The ultimate solution to this problem will come when this program is modified to spool the tablet data to a large-capacity disk drive, allowing the creation of lessons of almost any length.

The second limitation is the drawing ability of many educators. When teachers draw something on a blackboard in front of a live audience, they have little time to be critical of their own drawing skills. The situation is different for a teacher who is sitting at home creating a computer-based lesson for use by individual students. The desire to make the lesson pretty or to make the letters look "perfect" often results in frustration. A solution to this problem is for teachers with good penmanship to create a set of well-drawn letters for this program, for distribution to other teachers whose handwriting is not so good.

The Authors of Tomorrow

The availability of direct-manipulation authoring systems such as Move-N-Write Along and Filevision may provide increased impetus for teachers who want to create their own instructional software. This development will finally help turn the personal computer into the tool for individualized instruction that everyone says it should be. As more and more teachers take software creation into their own hands, the commercial companies that are working in this area will have a new challenge. Rather than just providing an interesting array of instructional software, these companies are going to want to put more and more effort into producing authoring systems that make it easier for teachers to create their own instructional programs.

A rosy future lies ahead for companies that want to help unleash the creative talents of our millions of teachers and for those teachers who realize that they can become software authors without having to learn a formal programming language. ✚

Dr. David Thornburg has been active in the field of personal computers in education since 1978. He is the inventor of the KoalaPad touch tablet and is the principal designer of Muppet Learning Keys. He has written more than ten books on computing, many of which are of interest to educators.

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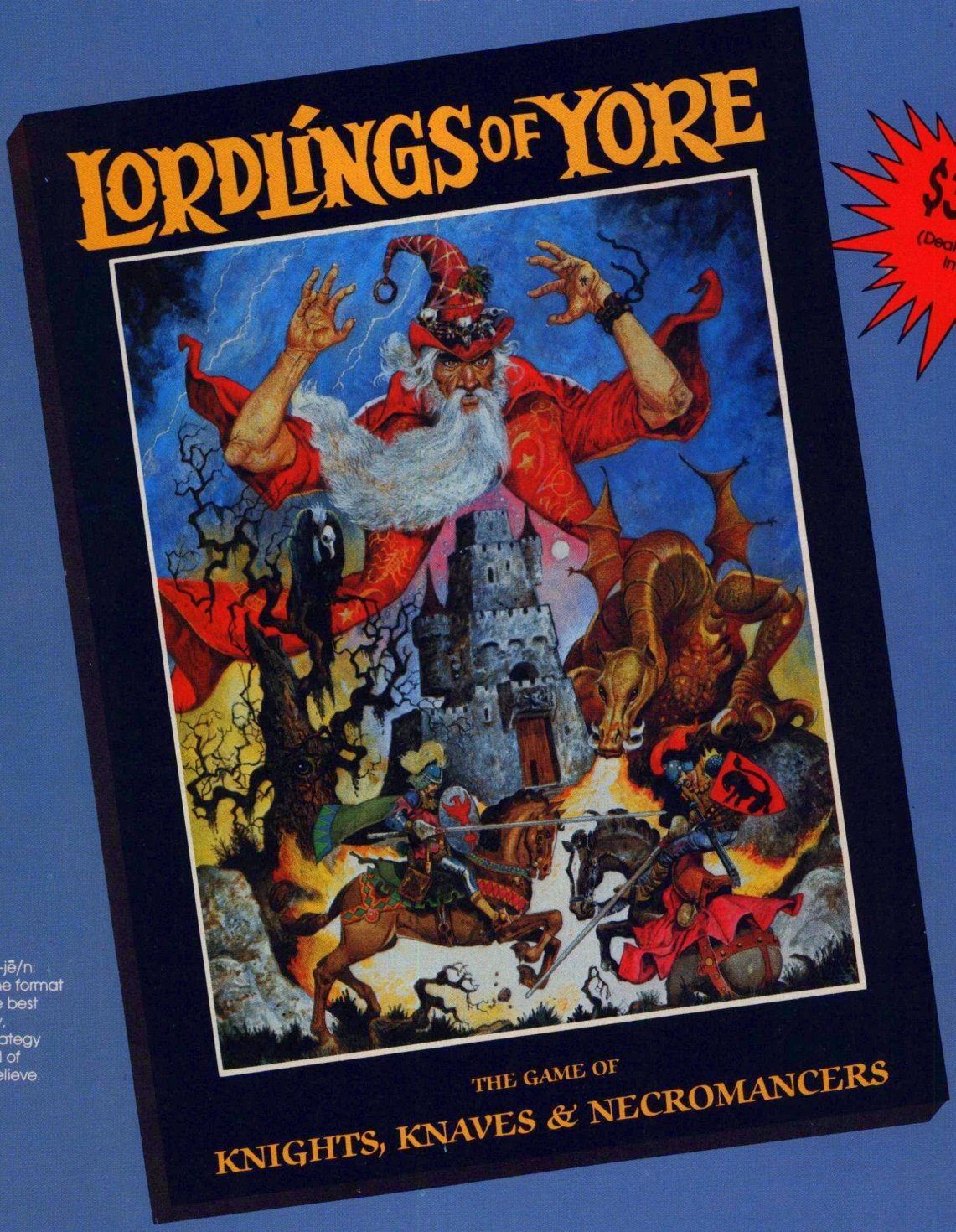

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An explosion in the flight-simulation market gives you ten programs that transform your Apple II into a machine that mimics the physics, actions, and reactions of a real aircraft.

APPLE II • GETS ITS wings

You're in a level attitude and on course to Lindbergh Field in San Diego, when you unexpectedly encounter strong head winds accompanied by turbulent down drafts. Suddenly, your fuel consumption increases at an alarming rate, and you must now plan an emergency landing descent. Your actions are calm and methodical as you execute the required aircraft maneuvers. These precautions are unnecessary, however, as your Piper Cherokee's engine now quits from lack of fuel and begins a doomed spiral into the ground. With a simulated tooth-jarring thud, the Apple computer's monitor displays the chagrining epitaph CRASH. Undaunted, you reboot the flight-simulator program, determined to solo this afternoon.

In the world of Apple II flight-simulation software, such an abrupt finale is a foregone conclusion. In fact, in the majority of flight-simulation programs, if you don't crash the aircraft yourself, vast hordes of enemy aircraft, SAMs (surface-to-air missiles), tanks, and air-to-air missiles are trying to shoot you down.

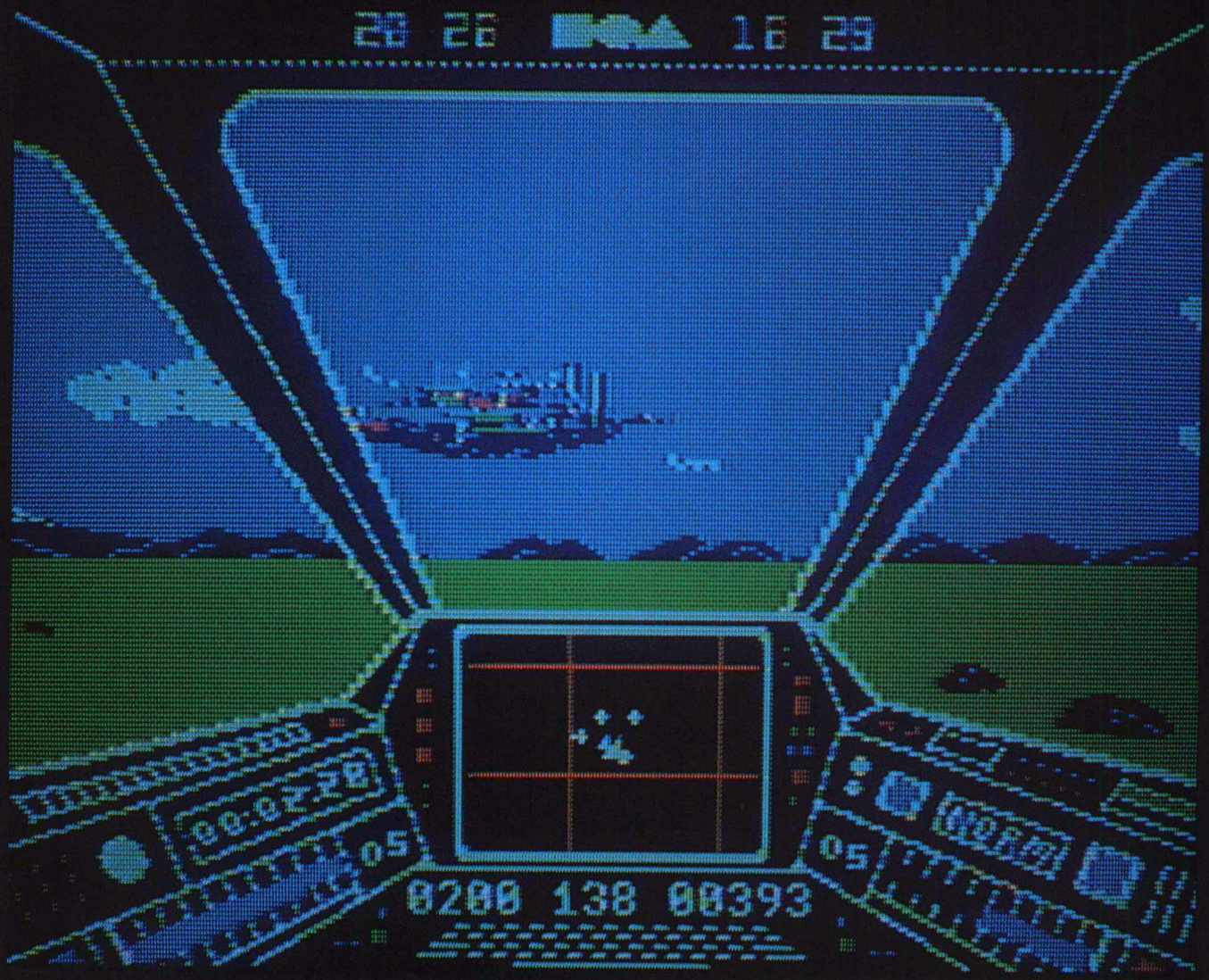
A recent sampling of the flight-simulation market turned up ten Apple-II-series programs. This figure is startling, especially when you compare it with the number in 1979: one program available. This population explosion in Apple II flight-simulation programs reflects consumers' greater interest in visual realism. In other words, a program with a 3-D, real-time display outsells a similar product that is based on scenario simulation.

The Daedalian Apple

Before examining this flock of ten flight-simulation programs, let's determine exactly what a flight-simulation program is. Historically speaking, the flight simulator went through three major evolutionary levels. First, we had the public-domain lunar-lander genre. The ultimate goal with a lunar lander was to safely land a spacecraft on the moon (or another foreign body). To accomplish this mission, the "pilot" entered control values from the keyboard and then watched the results on the monitor. All of this action was conveyed without graphics, leaving the pilot to experience both thrill and agony via the written word. Also, this level of simulation gave the pilot limited cockpit instrumentation. From our current perspective, this level was not a flight simulator.

Next, graphics imagery overpowered the written word, and Zaxxon, Choplifter!, and their clones dominated the flight-simulation skies. This level presented the pilot only with an outside profile of his aircraft.

The third and final level



comprises today's flight-simulation programs, which are true flight simulators. This software "places" the pilot in an incredibly realistic and functioning cockpit, transforming the Apple into a machine that mimics the physics, actions, and reactions of a real aircraft. In fact, these programs are so realistic that anyone who wants to attain top gaming skill absolutely needs to study the physics of flight.

Reviewing the ten flight-simulation programs led to a neat dichotomy. All of these programs fit into either a passive or an aggressive category. Passive flight simulators present a strictly flight-oriented mission. On the other hand, the aggressive flight simulators couple the flight element with a combat objective. Curiously enough, SubLOGIC's ancient Flight Simulator II combines both a passive and an aggressive format on the same disk.

You press the ignition button. The entire cockpit shudders as the shuttle begins its ascent into space.

The following reviews are arranged in alphabetical order according to the manufacturer's name. A comparative analysis of these programs appears in the chart on the following pages.

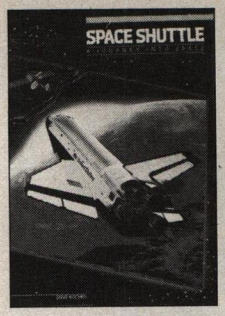
Space Shuttle—
A Journey into Space

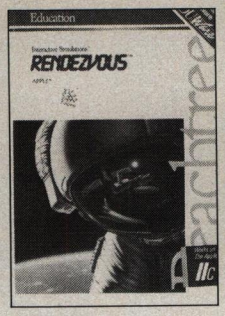
It's T minus 15 seconds and counting. Your main engine has been activated, and you brace yourself as you wait to ignite this massive power plant. Finally, at T minus four seconds, you press the ignition button. The entire cockpit shudders as the shuttle begins its ascent into space. You must ignore the roaring engine and the jiggling instruments and pay full attention to your piloting duties. As the stars appear and the daylight sky turns to black, you must deftly maneuver your craft to maintain your trajectory course and control your thrust to achieve orbit.

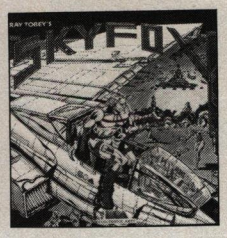
This exciting scenario represents only the beginning of your tasks as a space-shuttle pilot in Activision's Space Shuttle—A Journey into Space. Once this graphically appealing and technically accurate software gets you into space, you must stabilize your orbit; dock with an orbiting satellite; and, finally, complete the mission by gliding back to Edwards Air Force Base.

Although this software was not designed to serve an educational function, in many regards it sur-

Flight Simulation Programs Comparison







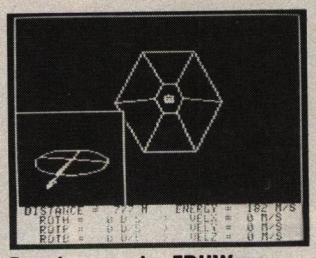
	SPACE SHUTTLE	RENDEZVOUS	TRANQUILITY BASE	SKYFOX
Manufacturer	Activision	EDUWare	EDUWare	Electronic Arts
List Price	NA	$39.95	$39.95	$40
Type of Propulsion	Rocket	Rocket	Rocket	Jet
Number of Control Commands	25	16	19	25
Passive Format	■	■	■	
Aggressive Format				■
Aerobatic Ability				
Multiple Skill Levels	■			■
Multiple Players				
Color Monitor Required	■		■	
Keyboard Reference Card				
Sound Effects	■	■	■	■
Copy-protected Disk	■	■	■	■
Copy-protected Manual				
Overall Ranking (see text)	2	9	7	1

passes EDUWare's Rendezvous program in its educational value.

Rendezvous

What sounds like a piece of software geared for some Parisian night-club liaison is actually one of the poorer flight-simulation programs. Flight in this case is in space. EDUWare's Rendezvous places the pilot behind the controls of a NASA space shuttle. The pilot takes the shuttle from lift-off, through the attainment of a successful orbit, to the final approach and docking with an orbiting space station. Unfortunately, even with this exciting premise, the actual flying is muted by inadequate sound, confusing documentation, primitive graphics, and the necessity for making difficult mental mathematical calculations.

The lift-off sequence in Rendezvous is the most confusing simulation of all. A documentational bug aborts every lift-off attempt: The manual says to use a joystick for control when, in fact, the program



Rendezvous by EDUWare Services, Inc.

totally ignores all joystick commands. A quick check of the keyboard illustration (an Atari version) on page 4-4 reveals the problem. Someone forgot to change the documentation to reflect the Apple program translation. The proper sequence is to use the Apple's Return key for ignition and the arrow keys for lift-off directional control.

Even if you ignore the erroneous Atari documentation and the minimal sound effects, Rendezvous is still only a primitive flight-simulation program. Using a keyboard for intricate shuttle lift-off control is less than ideal and further hampers Rendezvous' performance. Also, some math aptitude is required, and the cockpit display panel can be both confusing and downright objectionable to a pilot lacking in this math background.

Tranquility Base

Space-flight-simulation aficionados have long endured unappealing, text-oriented lunar-lander programs. Not surprisingly, these programs never got off the ground, because of their inaccurate flight-progress readouts and their lack of graphics. Apple-computer owners can be thankful, however, for a new space-flight-simulation program. EDUWare has taken one giant leap for lunar-lander programs with its introduction of Tranquility Base.

Set in the 21st century on a landing pad near America's first lunar colony, Tranquility Base sends the pilot on practice lift-off and landing missions in a NASA Lunar Excursion Module (LEM). By mastering thrust to control altitude and by fine-tuning the LEM's orientation in the x, y, and z planes, you can enjoy a three-dimensional space flight.

Tranquility Base was intended to introduce its pilots to the laws of gravitation and motion. Although the program accurately fulfills this purpose, the slow pace of the action might put off those

F-15 STRIKE EAGLE	SOLO FLIGHT	AIRSIM-3	SPITFIRE SIMULATOR	EAGLES	FLIGHT SIMULATOR II
MicroProse	MicroProse	Mind Systems	Mind Systems	SSI	SubLOGIC
$34.95	$34.95	$44.95	$40	$39.95	$49.95
Jet	Piston	Piston	Piston	Piston	Piston
23	30	50	36	21	66
▬		▬			
▬			▬	▬	▬
▬		▬	▬	▬	▬
▬	▬			▬	▬
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					▬
					▬
▬	▬	▬	▬	▬	▬
▬	▬	▬	▬	▬	▬
▬	▬				▬
4	8	6	3	NA	5

who are pursuing the action of an arcade-type game. Anyone who is looking for realism in a space-flight-simulation program and who does not mind the program's slow pace will enjoy Tranquility Base.

Skyfox

Unrealistic aircraft performance has been romanticized through the proliferation of science-fantasy films. Spacecraft configured like conventional jet fighters streak through the heavens with nary a thought of the laws of physics. So be it. A fantasy isn't supposed to be that real, anyway. Continuing in this flight-fantasy tradition is Skyfox from Electronic Arts. Hold onto your hats, Northrop and Lockheed, Skyfox can do 0 to Mach 4 in four seconds. Actually, with the scenarios that Electronic Arts has cooked up for Skyfox, this kind of fantastic performance is a necessity.

Without a doubt, of the ten flight-simulation programs, Skyfox has the best screen graphics. A rarity among flight simulators, and an area in which Skyfox excels, is sound. A Mockingboard option gives Skyfox Apple-shattering sound effects. Couple these two features with its fabulous documentation and a hidden bonus game, Alpha Invaders, and Skyfox is a strong contender for the position of the top flight-simulation program.

F-15 Strike Eagle

You're cruising along at 15,000 feet when you realize that your primary target is wtihin striking distance. You shove the joystick forward, placing your plane in a Mach 2 dive. At 1000 feet, you pull out of the dive and release your load of bombs directly over the target. The target is completely obliterated as you and your aircraft streak safely skyward. Although this

F-15 Strike Eagle by MicroProse Software

scenario is easy to recreate with F-15 Strike Eagle by MicroProse Software, a true F-15 would have destroyed itself, as well as its pilot, in such a ridiculous maneuver.

The F-15 is a high-performance aircraft, but take away its power and it will drop like a rock. Strike Eagle's F-15, however, can glide back, crippled and out of fuel, over its home base with three MiGs on its tail and live to tell about it. This lack of realism renders F-15 Strike Eagle more a work of science fantasy than a program based on aeronautical fact.

Solo Flight

Anyone who feels a sense of nostalgia for Charles Lindbergh's early flights as a mail pilot will be intrigued by MicroProse Software's Solo Flight. As well as being a light-plane simulation, this program offers a mail-pilot game in which the pilot must deliver bags of mail in a vintage monoplane.

As you take your place in the cockpit of Solo Flight's light plane, you look out the plane's canopy at a runway. Your aircraft, however, is a profile,

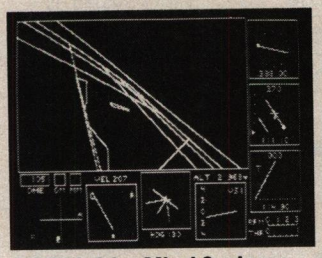
Although these flight-simulation programs don't make a pilot out of you, they do offer a fair amount of realism.

reminiscent of a Zaxxon craft, that sits ahead of you on the runway. This odd, schizophrenic perspective gives you the uneasy sensation of flying by remote control. In-flight judgment errors are easy to make from this perspective, so don't be surprised if your attempts at landing this light plane end in a crash.

Documentation is another sore point with Solo Flight. Not a single screen illustration awaits you within the 16-page documentation booklet. Futhermore, Solo Flight uses a method of documentation copy protection similar to that of F-15 Strike Eagle, also by MicroProse; Solo Flight's rendering is much easier to outwit, though. The program requests an account number only after the successful completion of a flight. If you don't feel like searching through your documentation for this number, just crash your airplane after a flight instead of landing. Solo Flight may have just earned itself the dubious distinction of being the only flight-simulation program that encourages crashing.

AIRSIM-3

The old saw "practice makes perfect" unfortunately does not always hold true for flight simulators. AIRSIM-3 by Mind Systems Corporation is quite similar to its predecessor, Spitfire Simulator, but one of the most important features of the former program is missing from AIRSIM-3. Because AIRSIM-3 is a passive simulation of aircraft flight, Spitfire Simulator's combat activities have been removed. Also lacking from AIRSIM-3 is a fuel gauge. This program might fulfill a pilot's desire for unrestricted flight time, but this program fault does destroy the sense of reality.



AIRSIM-3 by Mind Systems Corporation

The final word on AIRSIM-3 is that it's just plain-vanilla software. Although it performs adequately in normal flight procedures, it lacks the flavor that would have made it a more enjoyable program. More important, finicky instruments drain the fun even out of flying aerobatics.

Spitfire Simulator

Many aircraft were flown and many heroes were made during the Battle of Britain, but the Supermarine Spitfire ranked as Great Britain's leading fighter plane. Now you relive the ultimate in fighter flying as Mind Systems puts the Battle of Britain on the disk and you in the cockpit with Spitfire Simulator.

Spitfire Simulator differs from its closest competitor, F-15 Strike Eagle, in that you must take off and land the aircraft on each mission. A complete, gaugeless cockpit control panel gives Spitfire Simulator all of the instruments necessary for successfully accomplishing these operations.

Spitfire Simulator is a strong flight-simulation program in spite of a few minor drawbacks. Tooling about the skies with Spitfire Simulator may well be your finest hour spent flying a flight-simulation program.

Eagles

If your nerves aren't made of steel, and joystick flight isn't your greatest skill, then Strategic Simulations, Inc., has the ideal solution: Eagles. Eagles is a World War I dogfight recreation. All of the action is represented through aircraft movement and gunnery phases. Keyboard input determines altitude, maneuvers, and weapon fire.

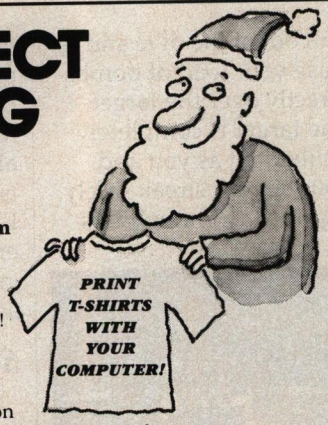
Eagles offers three luxuries that other flight simulators don't: The flying is not controlled by human reflex actions, one pilot can fly up to ten aircraft at a time, and two players can engage in aerial combat with each other.

Only two drawbacks lessen Eagles' excellence. First, the documentation lacks any illustrations. Visual aids would be beneficial for beginning pilots, although a demo game on Eagles' floppy disk acts as an informative tutorial. The second negative point concerns the misspelling of the German aircraft Phalz DIII. The correct spelling is *Pfalz DIII*. Both of these points are minor and would hardly be grounds for shooting down Eagles.

Flight Simulator II

The inclusion of SubLOGIC's Flight Simulator II in this review of flight-simulation programs is, if nothing else, a tribute to its longevity. This program

THE PERFECT STOCKING STUFFER!



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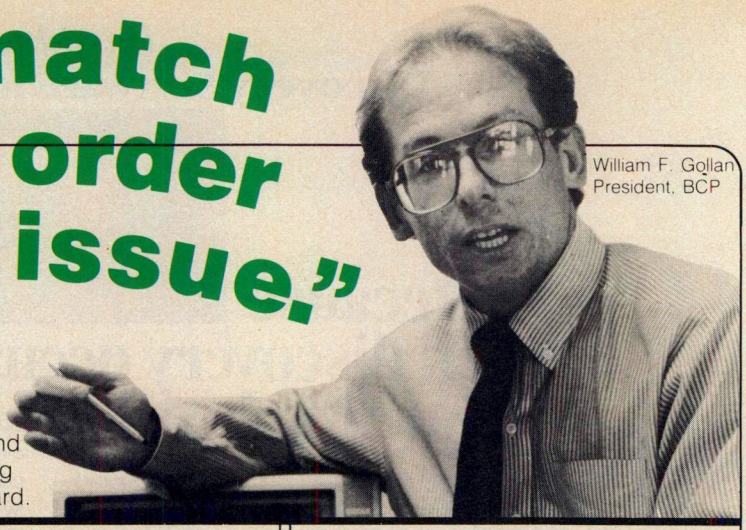

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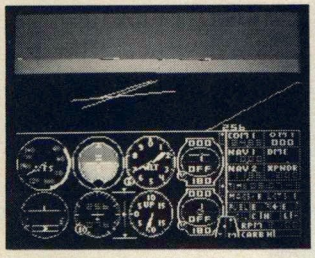
has undergone some major revisions and rewrites, but it is basically the same software that was the sole flight-simulator representative in 1979. None of the other simulation programs can make a similar claim, although programs such as Solo Flight are trying to duplicate the substance that produced this achievement.

Flight Simulator II's age does mean that it has lost its technological edge.



Flight Simulator II by SubLOGIC

Screen graphics, speed of program execution, and sound effects have all progressed beyond the standards the original version of Flight Simulator II set in 1979. Its only remaining superior feature is that it provides both a passive and an aggressive simulation on the same disk. Arm EDUWare's Rendezvous with satellite-tracking missiles, however, and even this advantage will be ancient history.

Our Overall Rankings

The final ranking for each program in our chart is a subjective value based on our hours of logged flight-simulator time, in which we examined three important criteria: graphics, sound, and performance. Keeping this yardstick in mind, Skyfox is the clear winner. In a strong second place is Space Shuttle—A Journey into Space. Space Shuttle offers a greater degree of flight realism than any of the other simulators do.

Following on the tail of Space Shuttle—A Journey into Space is Spitfire Simulator. Granted, F-15 Strike Eagle has a more colorful display than Spitfire Simulator does, but the latter program's performance is superior. The result of this dogfight leaves not-too-realistic F-15 Strike Eagle a close fourth. The classic Flight Simulator II, with its dual personality, holds fifth position. AIRSIM-3 flies by in sixth place on the strength of its performance. Flying straight and true in the seventh slot is Tranquility Base, featuring modest graphics in an educational package. The schizophrenic Solo Flight is eighth. Rendezvous stalls in orbit and finishes ninth. Finally, because of its unique simulation presentation, we excluded Eagles from the overall rating process.

The Fate of Icarus

The future of flight-simulation programs is extremely strong. Looking ahead to the many planned new releases, the number of flight simulators will have almost doubled one year from now. Similarly, the graphics, sound, and performance of this new breed will be far superior to the features of the ten reviewed here.

This proliferation will let all the simulator pilots out there strap themselves into a fully functional airplane cockpit. Although these flight-simulation programs don't make a pilot out of you, they do offer a fair amount of realism to Apple owners. Of course, flight-simulation programs repeatedly chant the old admonition "Whatever goes up must come down." After the crash, the flight simulator whisks you back to the program's beginning and restarts the airplane, with little regard for the mess you were just in.

Continued on page 113

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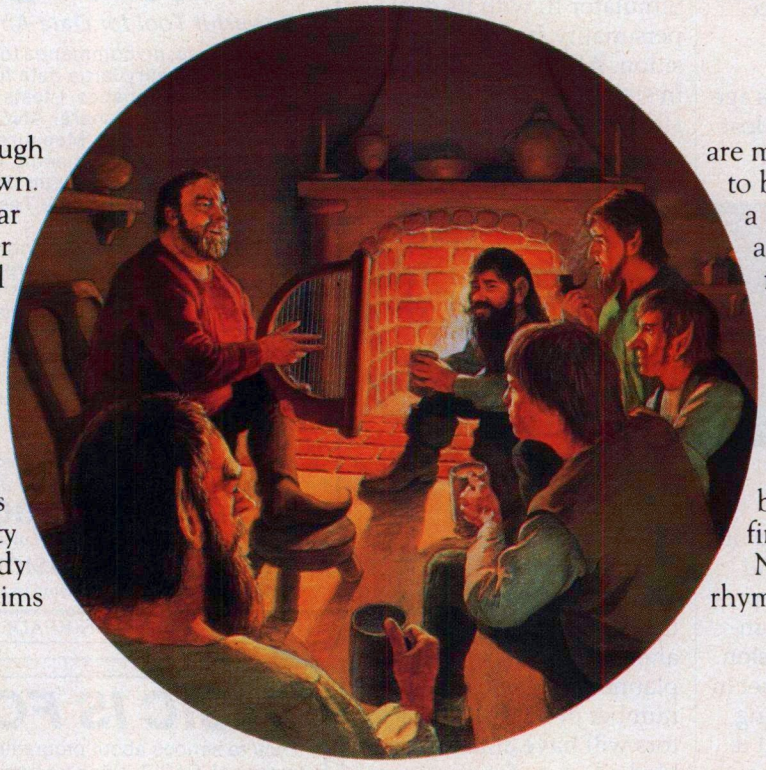

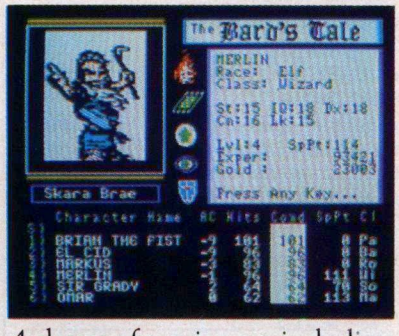

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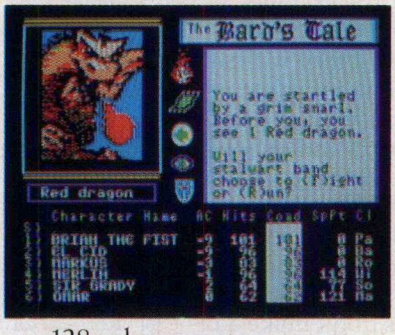

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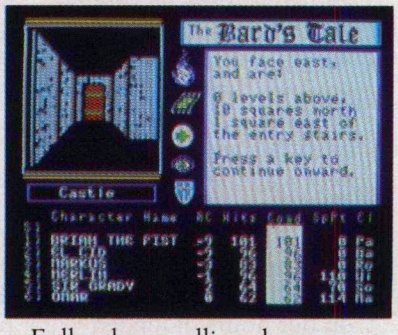

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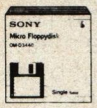

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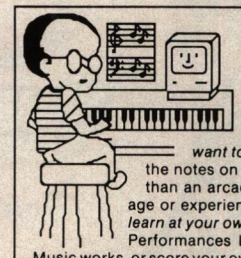

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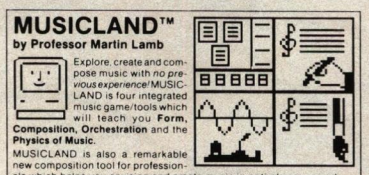

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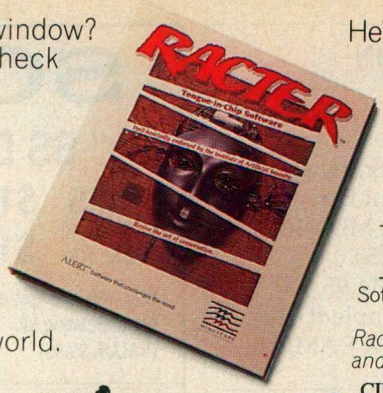

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Unfortunately, the "details" include little more than a description of the item snatched, the name of a city, and a set of dossiers describing members of the Carmen Sandiego gang. "Slippery and mean" is the chief's off-hand observation as he hands over a plane ticket and your passport. "Just remember, get an Interpol arrest warrant as soon as possible; you've got 'till 5 P.M. Sunday. Crack this one, kid, and it'll mean a fat commission for the agency and a juicy promotion for you!"

Brøderbund's Where in the World Is Carmen Sandiego? features advanced hi-res windowing, beautifully done city scenes, and more geography-oriented trivia than you can shake an atlas at. So, naturally, a complete 1985 World Almanac is included. Sound effects, music, a few animation sequences, and a comprehensive manual round out one of the slickest, smoothest-running game packages ever.

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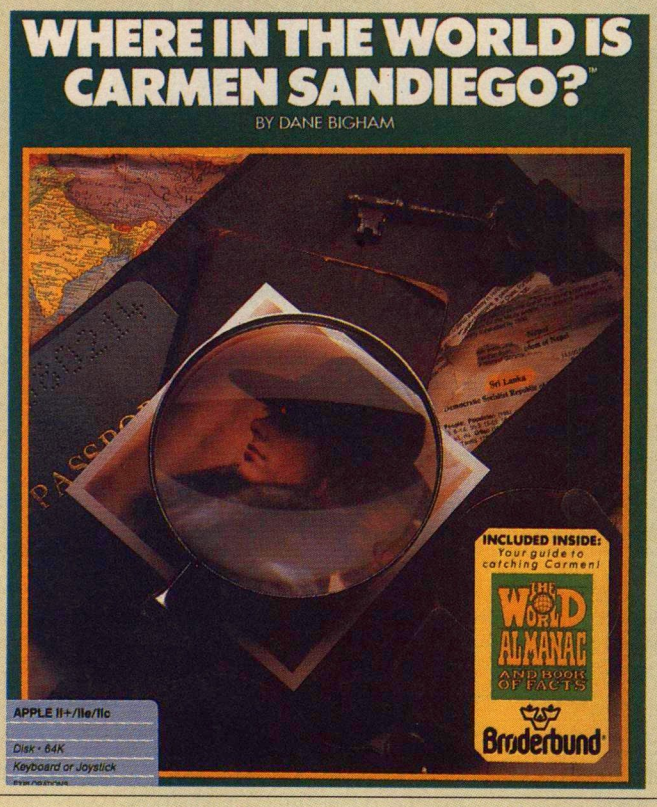
Success leads to boosts in rank as well as increasingly challenging scenarios. Higher-ranking sleuths must cover more cities, spend less time in each, and occasionally take calculated risks. Yet only an Ace Detective can send Carmen herself over for the big fall, thus winning retirement in the Detective Hall of Fame. Hall



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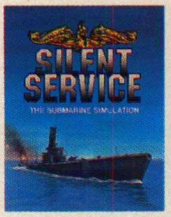

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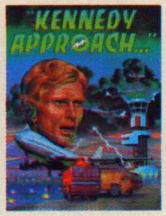

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"Command Series" is available for Commodore 64/128, Apple II Family, Atari XL/XE, IBM PC/PC Jr. computers for a suggested retail of $39.95. Available soon for Macintosh.

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and Roster displays—the latter showing name, rank, and cases cleared for each player—come up automatically at the end of a session. (The manual erroneously refers users to Control keys to call up these displays.)

Though fine for lone players, Carmen Sandiego is a game whose full entertainment potential is most evident in family or game-group settings. Everyone who sees the game wants to play, and practically anyone who reads can! A rare blend of highly educational trivia, deductive challenge, and humor, Where in the World Is Carmen Sandiego? is a refreshingly original contribution to computer gaming, a sure winner.

Jeff Hurlburt

Where in the World Is Carmen Sandiego?
Brøderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903-2101
(415) 479-1170
List Price: $39.95
Requires: Apple II Plus, IIe, or IIc; 64K RAM; one disk drive

CIRCLE READER SERVICE NO. **400**

BEAT THE CLOCK

Time is of the essence in this graphic adventure game. You have only 24 (game-time) hours to beat the clock, as Dr. Maybe's Doomsday Machine counts down toward certain destruction for us all. As Captain Goodnight, the spunky, James-Bond-type hero, you must fight through hordes of hazards that want to slow you down—permanently, if possible. Watch out for killer satellites; laser-zapping robots that toss gre-

nades; and, worst of all, the tromp, tromp, tromp of the Tremho Beserkers.

You'll certainly never make it if you don't commandeer enemy vehicles for faster travel. Part of the fun is navigating a speedboat, flying a seaplane or helicopter, and riding an aerial tramway. Don't waste time on locked tanks or disabled trucks, though. The design of vehicles such as the jet and the rescue saucer is first-rate, with smoothly moving parts and realistic action.

The character animation is outstanding, considering the detail available on the Apple II screen. Captain Goodnight bounces when he runs, winces when he's hit, and then dusts himself off with renewed determination for the next challenge. If he gets bored waiting for you to make up your mind, he plays with a yo-yo. This human quality of the hero is due to Gene Portwood, one of

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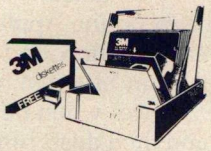

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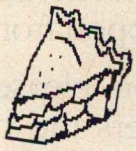

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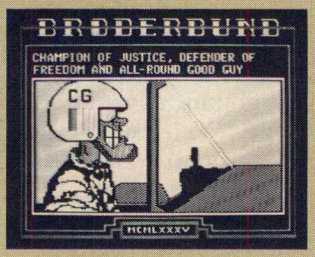
the three designers, who was an animator at Disney before he "got into computers."

The Code De-Scrambler that comes with the package is essential for your survival and shows that Captain Goodnight sure knows how to repel those software pirates! Inspired by the decoder the old-time Captain Midnight radio show used to give away, this one is a double disk that displays a different letter for each color/number combination the computer asks for. Enter the wrong letter and you won't be able to board the submarine and reach Odom Island. When, against all odds, you actually reach the Doomsday Machine, only the correct Deactivation Combination will provide the key to save the world.



When, finally, you make it through the last tunnel *and* reach the Doomsday Machine *and* pull the right levers *and* enter the correct code—then you are rewarded with a dramatic finale. The skull-shaped hulk of Doom Island crumbles and sinks beneath the waves as Captain Goodnight's saucer streaks skyward. If you miss, then it's goodnight, Captain—rise and shine on another morning, another game, another go at racing the clock.

Anthony Reveaux

Captain Goodnight and the Islands of Fear
Brøderbund Software, Inc.
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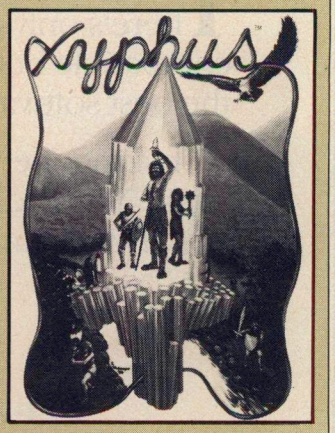
Requires: Apple II, II Plus, IIe, or IIc; 64K RAM; one disk drive

CIRCLE READER SERVICE NO. **401**

BLOODTHIRSTY THRILLS

A couple of programmers named Skip Waller and Dave Albert are taking up an awful lot of my free time. This pair of imaginative code writers has invented the mythical land of Arroya; populated it with some of the fiercest creatures this side of the Sea of Mithral; and charged a quartet of intrepid adventurers with the quest of ridding the land of a devious, dastardly, and downright nasty demon whose name is Xyphus.

Xyphus, a graphic fantasy/role-playing game from Penguin Software, takes you and three stalwart companions into the heart of Arroya to vanquish Xyphus, the demon,



and retrieve a huge gemstone.

Your four characters (a choice of human, elf, or

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Designed by Joy George
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dwarf, and either wizards or warriors) start without weapons, armor, or experience. As they roam the land, they try to defeat a multitude of hostile creatures. Each victory yields

gold pieces and experience. The former are for purchasing the armor and weapons. The latter represent incremental steps toward becoming more accurate with a weapon and more difficult to hit.

An entire game consists of six scenarios, or quests, requiring you to find some magical object and deposit it in a friendly outpost fort. The problem is persuading the dozens of evil denizens guarding the object to part with it.

If you think Arroya is ripe for a character with a silver tongue and trusting personality, forget it. Xyphus is hack and slash, batter and bash, crunch and crash. Dispense with diplomatic dialogues. Pass off polite puffery. Henry Kissinger, move over; here comes Conan.

I rather enjoy this change of pace. After working on numerous all-text Infocom and Synapse adventure games and tying enough mental knots to earn a Boy Scout merit badge, it is a welcome relief to cleave goblin heads and zap lycanothropes. Not that the creatures roll over and die—quite to the contrary, these evil beasties are lethal.

Like a friendly wizard, I have three tips for would-be adventurers. First, save

Henry Kissinger, move over; here comes Conan.

your games often, but only after you have defeated a foe and grabbed a treasure. Second, you can often flush out a group of evil guardians, stage a fighting withdrawal back to a fort, and fight next to the fort. While the creatures tire and receive wounds, you jump in and out of the fort, getting free and prompt medical treatment. Finally, against a few opponents, you can grab the treasure by simply dashing in, picking it up, and dashing out.

All in all, Xyphus is a welcome respite from those all-too-hard puzzle-laden adventure games. The graphics are good, the game play moves along, and the land of Arroya proves to be a rich melting pot of evil. In Xyphus, the sword finally is mightier than the pen.

Russ Lockwood

Xyphus
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My Dearest Sugar Toes, My heart flip-flops when you tell me your car is overheated.

For love letters, you can choose from Flaming Passion, Friendly Fun, or Fading Fast. The computer asks who it's from and whether it is for a male or a female. Each time you keyboard M for more, you are liable to get something like this:

My Dearest Sugar Toes,

Long hours have I spent thinking of you! I promise we shall never quarrel. My heart flip-flops and turns cartwheels when you tell me your car is overheated. I like to fondle your albino gorilla suit! Sorry about last night, but first come, first served. If only you hadn't had that operation I would marry you today and again tomorrow! There is no greater portrait of loveliness than your spirited moustache. I need you! Make some excuse and come right now!
Devotedly yours, Romeo.

Send her a love letter like *that*, and you might get back a well-deserved Babble 123 Fading Fast reply:

You Conehead!

I feel like we're in a bad movie watching the way you have your sister call to cancel our dates. If only I'd listened to my mother, I'd have had some real fun. I can't believe you'd want to stuff and mount me.

My answering machine is sick of your voice!
Juliet.

Babble 123 permits you to change and substitute words and phrases easily within the block files of its Edit mode. There, you can tailor them to speak the language of your very own peer group. By embellishing these letters with the graphics available in programs such as Brøderbund's Print Shop or Springboard's The Newsroom and using colored ink ribbons on your printer, you can prepare for a Valentine's day that your friends—and you—will never forget!

Anthony Reveaux

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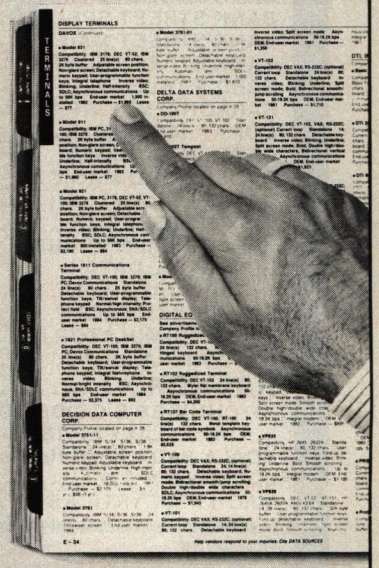

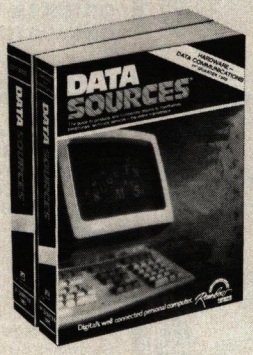

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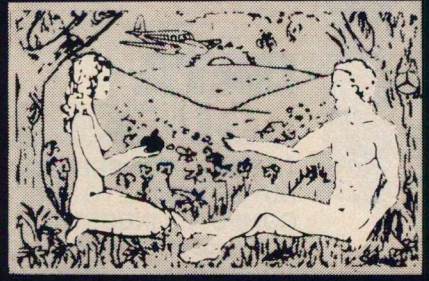

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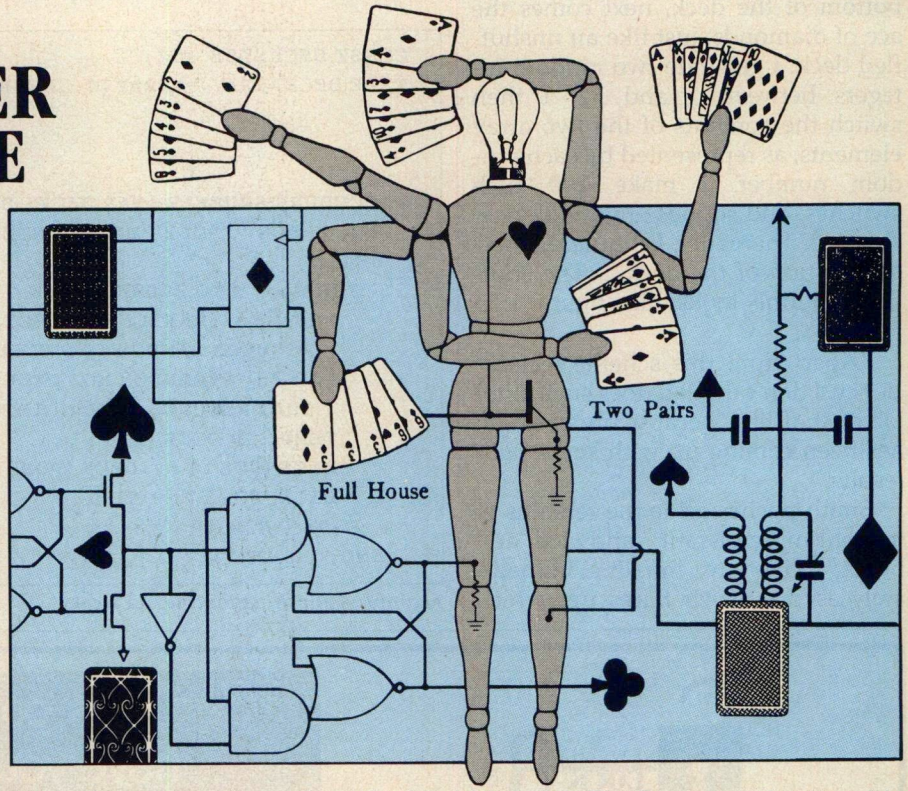
CIRCLE 262 ON READER SERVICE CARD

BY MICHAEL WIESENBERG

THE COMPUTER CARD SHUFFLE

In search of the perfect card-shuffling algorithm



WILLY KEATS

Quarter after one at I-Q Industries in the heart of Silicon Valley: The company-subsidized cafeteria is nearly empty, having stopped serving its reasonably priced meals 15 minutes ago. Seated at one table are five friends lingering over the remnants of their meal. They usually come in for lunch at quarter to one to avoid the noontime crush.

The table has been moved to rest half in the smoking section and half in the nonsmoking. This arrangement accommodates system operator Marian Smith, sitting at the smoking end, separated from the rest by a one-chair buffer. The rest tolerate her vice because, without her, the entire fragile computer network would strangle in its miles of communicating cables and suffer sensory overload from the hundreds of simultaneously running programs competing for CPU time.

Salle McRae, hotshot programmer of the gorgeous-young-female persuasion, is the only one who did not eat in the cafeteria. She lunches elsewhere and then joins her friends for conversation. "Peach is in at Gelato."

Grey Scrivener, senior technical writer during working hours and aspiring novelist the rest of the time, knows that she is referring to the arrival at the Sunnyvale Gelato Classico of his favorite flavor. He takes the last bite of his wilted-spinach salad. "Maybe I'll join you for lunch tomorrow." He pours the last of a Diet 7-Up into his glass.

Spotswood Gilbert, appreciated as much for his bug-free, well-documented programming code as for his ability to get along with all coworkers, finishes a slice of blueberry cheesecake and starts on a piece of chocolate meringue pie. "Do you have a name for your novel yet?"

Scrivener adjusts the knot of his mauve knit tie against the collar of his perfectly pressed pink dress shirt. "I've been thinking of *Silicon!*, with an exclamation point. I can see the cover blurb now, 'What *Wheels!* did for Detroit, *Silicon!* does for Silicon Valley.' "

Can you devise a card-shuffling algorithm that thoroughly mixes the deck in as few lines of code as possible?

Bob Levin, hotshot hacker of the slovenly-young-male persuasion, finishes his Dr. Pepper and wipes his mouth on the sleeve of his Firesign Theatre T-shirt ("Everything you know is wrong.") He absentmindedly pushes long blond hair out of his eyes. "Shouldn't that be a bang?"

"In the very limited context of programs and operating systems, the exclamation point seems more and more frequently to be using that alias, one that originated, by the way, in printers' slang; that meaning has not yet entered general usage, however." Scrivener always has the last word on grammar and etymology. The others still like him.

Levin would rather discuss puzzles than the proper use of the English language. "I've been working on a poker-analysis program, and it runs much too slowly. One of its problems is the shuffling algorithm. I'm sure there's a better way to simulate card shuffling than what I've been doing. I initialize a 52-element array, or 53 if the deck has a joker. A routine elsewhere in the program equates each of

the numbers from 1 to 52 (or 53) uniquely with a card. The number 1 represents the ace of clubs, 2 the ace of diamonds, and so on, up to 51 for the king of hearts and 52 for the king of spades, and 53, if I use it, for the joker.

"At the start of the program, the first element of the array contains the number 1, the second the number 2—that is, the ace of clubs is at the bottom of the deck, next comes the ace of diamonds, just like an unshuffled deck. I generate two random integers between 1 and 52. I then switch the contents of the two array elements, as represented by each random number. I make 200 such switches, and supposedly the deck is shuffled. Thereafter, I shuffle the new distribution of the deck." (The shuffling routine looks like figure 1 in Pascal.)

"Apart from this scheme's inefficiency, I don't think it does such a hot job of shuffling, because my program has been coming up with some poor results."

Smith pushes aside the remains of her shrimp-croissant sandwich and lights a cigarette, inhaling immediately as the match flares up, which fills her lungs with as much sulfur as tobacco. She's used to it. "How do you know 200 switches are enough? Maybe you need 2000 to mix the cards thoroughly."

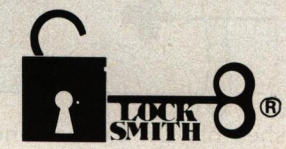
"That's the trouble: I *don't* know. I chose 200 because I didn't think that actual deck shuffling would result in that many cards switching position."

Gilbert starts loading the debris of his meal onto his tray. "You know what's wrong with that algorithm? You start with the high cards at one end of the 'deck' and the low cards at the other. A certain number of positions won't be chosen, which tends to leave the low end with a greater proportion of low cards and the high end with a similarly greater concentration of high cards."

McRae stands up. "How about if every time your program deals a card,

```
CONST DECKSIZE =52;
TYPE DECKARRAY =ARRAY [1..DECKSIZE ] OF INTEGER;
  .
  .
  .
PROCEDURE SHUFFLE (VAR DECK: DECKARRAY);
  VAR N, POS 1, POS2, TEMP: INTEGER;
  BEGIN
    FOR N : = 1 TO 200 DO BEGIN
      POS 1 : = (RANDOM MOD DECKSIZE) + 1;
       {ASSUMES RANDOM IS PREWRITTEN FUNCTION}
      POS 2 : = (RANDOM MOD DECKSIZE) + 1;
       {THAT RETURNS RANDOM INTEGER.}
      TEMP : = DECK [POS 1 ];
      DECK [POS 1 ] : = DECK [POS2 ];
      DECK [POS2 ] : = TEMP
    END; { FOR N}
  END; { SHUFFLE}
```

Figure 1: A shuffling routine in Pascal



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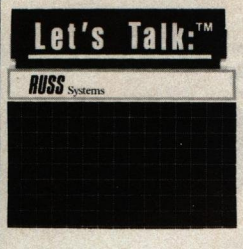

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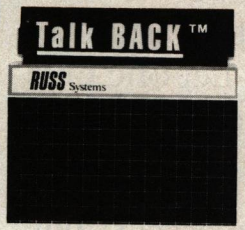

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it generates a random number and then uses that to choose a card? Then you won't have to shuffle at all."

"Then I'd have to check each time to make sure I hadn't already dealt that card, which I think would be less efficient than just one good job of shuffling. Besides, I want to approximate the way poker is actually dealt. First the cards are shuffled, then they come off the deck one at a time."

Smith, Levin, Scrivener, and Gilbert carry their trays to a garbage can, scrape their plates, deposit paper and other disposables, and set the trays on the conveyor belt. McRae walks beside Gilbert, who looks somewhat disconcerted at the attention.

The best solution wins a one-year subscription to A+ and a Certificate of Excellence in Programming.

One thirty. Lunch is over. All head back to do their part in keeping the corporate octopus swimming.

The Problem

Here's the problem, folks. Can you devise an efficient card-shuffling algorithm, one that thoroughly mixes the deck in a minimum number of operations, and also in as few lines of code as possible? Your program (or piece of program) can be in any programming language that runs on an Apple-II-series computer or a Mac. The algorithm can be demonstrated in a pseudolanguage, if that is the best approach, or perhaps in a flowchart. The best solution wins a one-year subscription to *A+* and a Certificate of Excellence in Programming and will be published here. Remember that a good program is self-documenting.

All entries for this month's contest must be received by January 15, 1986. Please send all entries to Computer Calisthenics, *A+* Magazine, 11 Davis Drive, Belmont, CA 94002. If you want us to return your entry, please enclose a self-addressed, stamped envelope or diskette mailer. The winner will be selected by the author, whose decision will be final. The winning program will be announced in an upcoming issue of *A+*. ✚

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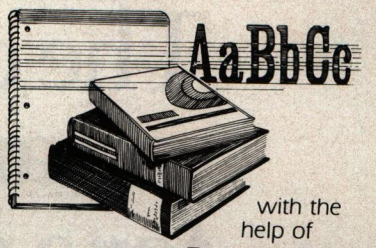

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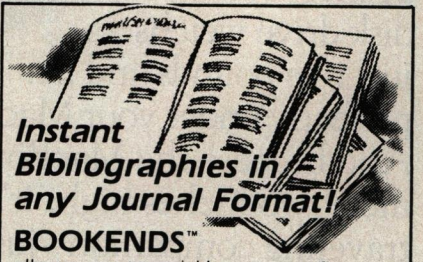

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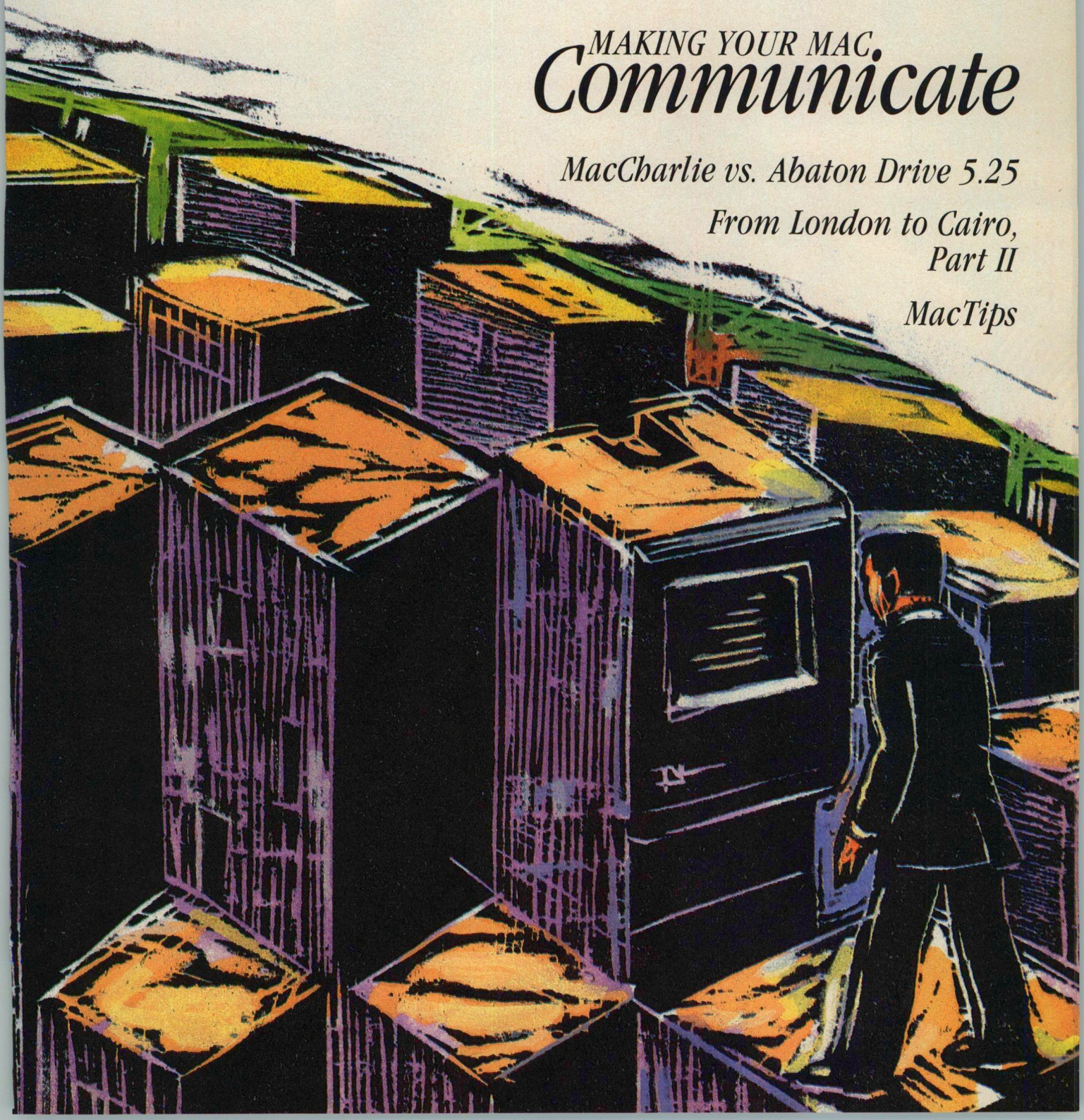

MAKING YOUR MAC Communicate

MacCharlie vs. Abaton Drive 5.25

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BY SUE CRISSMAN AND FREDERIC E. DAVIS

MacCharlie VS. Abaton

Abaton Drive 5.25 and MacCharlie: price isn't the only difference between these two file-transfer products.

If you like the Macintosh but haven't been able to use one at the office because you're working in an IBM-PC-dominated company, read on. Although Apple's Macintosh and IBM's PC series are not directly compatible, new hardware and software solutions are available that make it easy and straightforward to use the two machines together in the same workplace. The time has come when you can use your Macintosh to work with files created on an IBM PC, and vice versa.

Perhaps you work in a large corporation in which data has been created and stored in the IBM-PC-series format, but you'd prefer to use a Macintosh. Maybe you're a financial analyst or other spreadsheet user, and you're longing to trade in your PC and Lotus 1-2-3 for the power and elegance of a Mac with Microsoft's Excel. Maybe you'd like to use a Macintosh with a LaserWriter to produce graphics as only a Mac can. Or maybe you need to take company data home at night to work with on your Mac.

Several methods now available facilitate file transfer between a Macintosh and an IBM PC. Some of these methods involve making a direct connection between the two computers with cables and/or a modem (see "Bridging the Compatibility Gap, *A+*, March 1985, pages 74–78). Another method involves using a local-area network to interconnect the computers (see "Making the Hardware Connection" by Charles Rubin, on pages 30–40 in this issue). These methods are fairly involved, however, and require that you have access to both types of computers.

The two products we look at in this article, MacCharlie and Abaton Drive 5.25, do not require that you have direct access to both computers. All you need is the data on an IBM diskette, and you can transfer it directly to a Macintosh diskette.

The Abaton Drive 5.25 and MacCharlie both provide file-transfer capability by providing 5¼-inch disk drives that can read and write in the IBM diskette format. Both products include the cables and the software you'll need in order to perform file transfers. Although file transfer is what these two products have in common, there are some major differences between Abaton and MacCharlie. For starters, the suggested retail price of the Abaton is $695, and MacCharlie lists at $1795. Let's take a look at some of the other differences between these two products.

MacCharlie

The reason for MacCharlie's higher price is that, in addition to providing IBM-PC-format file conversion, this product is designed to let you actually run IBM software on your Macintosh. The Mac acts, in effect, as a terminal, and the MacCharlie subsystem contains a complete IBM-PC-compatible computer that can run the IBM software. If you want a Macintosh that can not only transfer files, but can also act as an IBM-PC-compatible computer, then MacCharlie is for you.

Billed as a coprocessing device, MacCharlie is a formidable piece of equipment. It consists of a keyboard extension that turns your Mac keyboard into an IBM PC replica, complete with numeric keypad and function keys. The MacCharlie system unit attaches to the side of the Macintosh quite handsomely and contains two 5¼-inch disk drives, 640K RAM, and an 8088 CPU. Both MS-DOS 3.1 and GWBASIC are included in the package. (Other versions of MS-DOS, PC-DOS, and UNIX also work with MacCharlie.) You can use MacCharlie either in the Macintosh or the PC mode.

You can transfer ASCII text files to and from Macintosh diskettes and IBM PC diskettes, and MacCharlie also lets you cut and paste text from IBM PC applications running on MacCharlie into Macintosh documents by using the Clipboard.

A short power cord connects the MacCharlie expansion unit to the Macintosh, so you can turn them on and off simultaneously with the MacCharlie switch. A cable connects the Macintosh printer port to the MacCharlie serial port. You connect your ImageWriter to the additional 9-pin port on the back of MacCharlie. A 62-pin bus-extension connector lets you add an expansion chassis for hard drives and other peripherals. The

CARTER DOW PHOTOGRAPHY

necessary software was not available at the time of this writing but should be released by the time you read this article.

Abaton Drive 5.25

The Abaton Drive 5.25 is a single-drive system that uses a built-in Z80 computer for the purpose of transferring files not only to and from IBM PC diskette formats, but also to and from many CP/M diskette formats and several UNIX diskette formats.

The Abaton package consists of the Drive 5.25, a power supply, cables, and software. The drive itself contains a Z80 computer with a 64K RAM CP/M system. A copy of CP/M 2.2 is provided for users who are interested in accessing CP/M software on the Mac. The Abaton connects to your Macintosh through the modem port, and the Drive 5.25 includes a second serial port and two parallel ports for adding peripheral hardware, which makes the Abaton double as a Macintosh port expander.

Ins and Outs of File Conversion

Transferring files to and from Macintosh and PC disks is, at first glance, a relatively simple process on both the Abaton and MacCharlie. The Abaton desktop provides listings of the files on each disk. You select the file you want to transfer; rename the file, if you wish; and click on Copy. You also choose from several options regarding carriage returns and line feeds. A dialog box informs you of the progress of the transfer. An Abaton menu includes both a Delete File and a Rename File command to make file handling a little easier.

With MacCharlie, you transfer a file by choosing Transfer File to Macintosh (or MacCharlie) from the File menu. If you're transferring from an IBM disk, you need to have a program called TRANSFER.COM in one of MacCharlie's drives. Our first try at transferring a file with MacCharlie took many attempts, as we kept getting a message that the transfer was "terminated abnormally."

As it turned out, the Macintosh disk to which the MacCharlie was transferring was write-protected. A message to that effect would have been helpful. (The Abaton program has a lock icon on the screen, so you won't make this mistake with it.) The MacCharlie program also does not inform you when file transfers are successfully completed. After finally hearing the appropriate whirring in both drives, we returned to the Finder to see that the document actually was on the Macintosh disk.

In addition to converting files, both of these products let you actually run non-Macintosh software on your Macintosh.

Transferring a file from one application to another is not always as easy as pointing to the Transfer a File command. The relative ease or difficulty can often depend on which software applications you are using on the different computers. Some software combinations work quite well. For example, Excel on the Macintosh and 1-2-3 on the PC are very well suited to one another, and you should have no trouble transferring data back and forth between these two programs. Other Macintosh programs, such as Omnis 3 and OverVUE 2.0, have excellent data-import and -export capabilities, which simplifies file transfers (see "Macintosh File Transfer" by Greg Mainis on pages 52–53 of this issue).

Some programs on the IBM PC are not as well suited for file transfers, however. IBM PC files that have been coded specially do not transfer well to the Mac. You need to know something about how an application program structures data, in order to make file transfers work well. If you can't find this information in the application's documentation, you can examine the files and experiment until you hit on a method that works. When opening a file converted to MacWrite, for example, you can choose between carriage returns at the end of every line or at the end of each paragraph. It takes only a minute or two to open the file with both options and see which you prefer. Usually you'll be using only a few different applications, so once you've made the choice, you won't have a problem (for more information on file formats, see "Breaking Down Barriers to File Sharing" by Steve Rosenthal on pages 44–50 of this issue).

Thus, file conversion can be as simple as transferring the file, but you may have to enter some information about line feeds, carriage returns, or other special characters. You may even lose some options or information, or, in the worst possible case, you may not have a usable file at all. Software companies are working to remedy this problem by creating file-translation utilities for the more popular application programs, but you should make sure the files you are planning to transfer can transfer properly, before depending on any method.

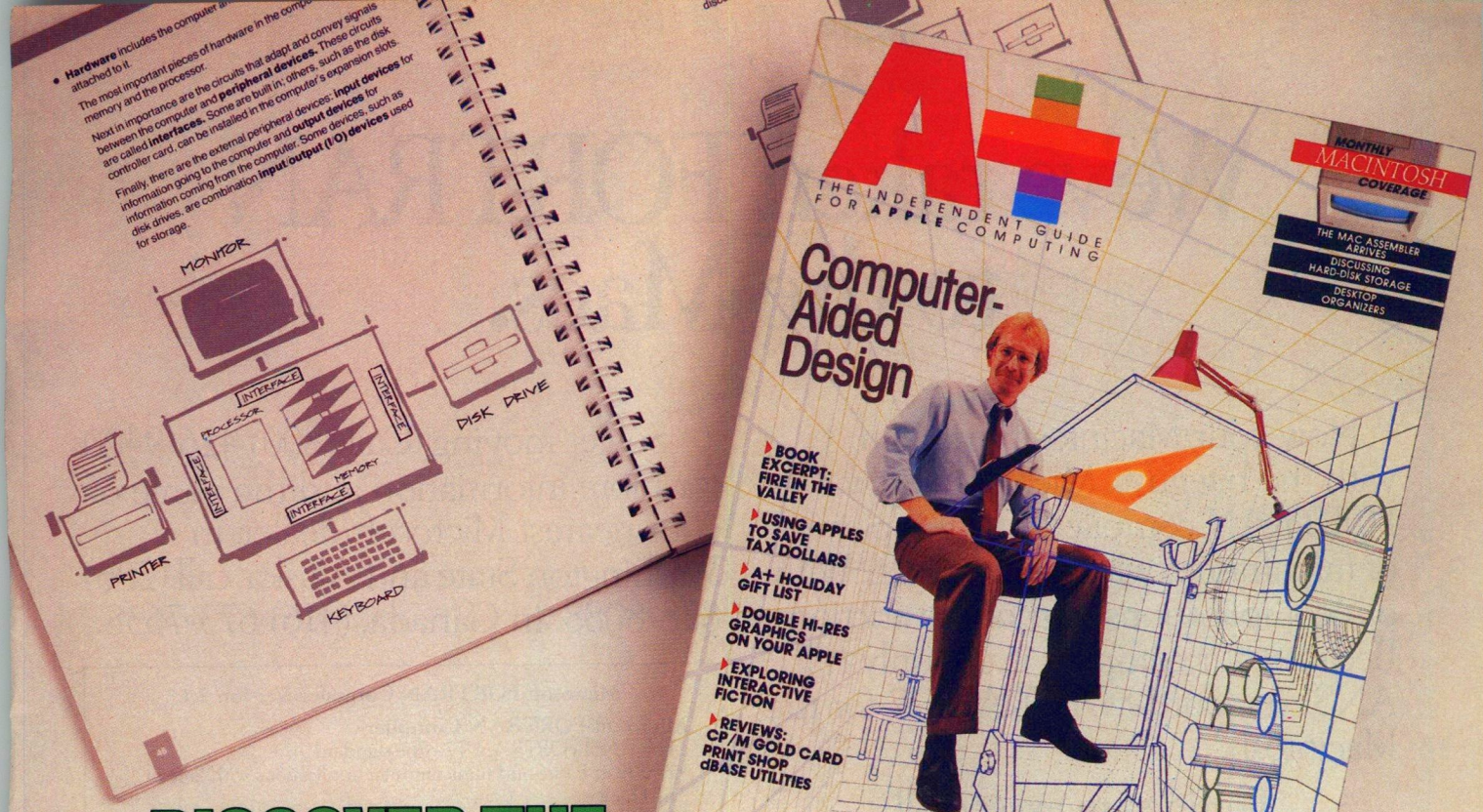
Other Features

In addition to converting files, both of these products let you actually run non-Macintosh software on your Macintosh. MacCharlie allows you to run IBM-PC-series software, and the Abaton Drive 5.25 enables you to run CP/M software. In both cases, the Macintosh functions essentially as a terminal that lets you send information to and receive it from the external processors.

With MacCharlie, you first load the MacCharlie software into your Mac, then you boot MS-DOS on the external subsystem, and finally you load your IBM PC application, using the 5¼-inch drives. The MS-DOS manual that comes in the package is extensive, and the MacCharlie users' manual provides a brief introduction that includes enough information to get you started and able to make backup copies of your disk. Once your application is open, you run it exactly as you would on an IBM PC.

While using MacCharlie to run IBM PC applications, you can copy text from the PC application to the Note Pad, Scrapbook, or Clipboard. You won't be able to use the menu to cut and paste information within the MacCharlie PC window, but you can paste Clipboard information into a MacCharlie PC document. You can also copy MacCharlie text from an IBM PC application, close the application, switch to the Macintosh mode, and paste the information into a Macintosh application.

You can print with the ImageWriter as you normally would. In addition, you can connect serial printers, modems, plotters, and other devices to MacCharlie's additional RS-232 port. If you wish to access a remote computer while you are in the IBM PC mode, you can attach a modem and use a terminal-emulator mode to handle the communication. The MacCharlie manual states that a networking feature and the ability to use the IBM PC Expansion Chassis are still to come.



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CIRCLE 156 ON READER SERVICE CARD

When you're simply running Macintosh software, MacCharlie functions as a print buffer that stores the print information in its memory so you can continue working without having to wait while printing is completed. The MacCharlie RAM is capable of storing around 300 pages for printing. When an IBM application is running on MacCharlie, the RAM is in use, and the print buffer is not available.

Using the Abaton for accessing CP/M software is a slightly different process. In order to run CP/M applications, you'll need to treat your Macintosh like a terminal by using a communications program—such as MacTerminal, Smartcom, or in-Touch—which you must provide. Cut-and-paste capabilities will be a function of the program you choose. Abaton is working on a print-buffer feature, but the software was not complete at the time of this writing, and this upgrade may cost extra. We were unable to review the Abaton documentation, but we've heard that a CP/M tutorial will be included in the package.

Deciding Which to Buy

If you're interested in transferring files, both MacCharlie and Abaton can do the job at this time. The differences lie in the other features that these two packages offer and in their very different pricing. If IBM PC file transfer is your only concern, then the Abaton Drive 5.25, which retails for $695, is probably the better choice. The Abaton also gives you the ability to convert files from many types of CP/M computers, such as Kaypro, Osborne, and Televideo. Also, you can use the Abaton Drive 5.25 to run CP/M software.

If you need file-transfer capabilities but also want to run IBM PC software, then MacCharlie is the way to go. MacCharlie, with its hefty $1795 price tag, is a handsomely designed IBM-PC-compatible subsystem that runs many, but not all, IBM PC programs. When you use MacCharlie as an IBM-PC-compatible, the screen cannot show graphics, and information writes to the screen more slowly than with most other IBM PC compatibles.

Both MacCharlie and the Abaton Drive 5.25 address the need to share information between Macintoshes and IBM PCs. MacCharlie is probably going to enjoy its warmest reception among corporate data-processing troubleshooters who need to use IBM PC as well as Macintosh software. The Abaton Drive 5.25 will probably be the best solution for individual Macintosh users who prefer using Mac software but want to use data created by IBM PC programs. ✚

Sue Crissman is a San Francisco Bay Area writer, consultant, and contributing editor to A+. Her clients include Apple and other computer companies for which she designs and writes training, sales, and promotional materials. Fred Davis is senior editor of A+.

PRODUCT INFORMATION

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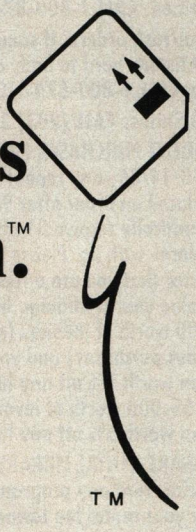

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MACOMMU

Four telecommunications programs that link your Macintosh to the world.

In this "get it there yesterday" world, telecommunications provides a definite speed advantage over other delivery services. The ability to transmit and receive information instantly offers a real boon to businesses and a real convenience to home users. Modem and telecommunications-software sales are burgeoning, and telecommunications services are reaping an increase in subscribers and connect time.

Those of you who have yet to enter the fascinating and productive world of telecommunications are going to have to buy a modem. Falling prices and increasing capabilities are making such an investment attractive. The hardware is only as effective as the software, though. Chances are, if you are considering buying a modem, you are also considering purchasing a telecommunications program.

Four programs—Hayes Smartcom II, Prometheus ProCom-M, Mainstay Telescape, and Palantir inTouch—offer a full range of telecommunications features and functions for the Mac. Although their specific procedures to invoke functions are different, each uses the mouse and icons to good effect.

Hayes Smartcom II

Hayes Microcomputer Products is a giant in the modem marketplace. Its Micromodem IIe, paired with Smartcom I telecommunications software, is well known by Apple IIe owners. Its Smartmodem line of internal and external modems, paired with Smartcom II software, is especially popular with IBM PC and PC-compatible owners.

NICATIONS

That leaves only the Apple Macintosh as odd business computer out—not because of the hardware, for one RS-232C port functions pretty much the same as another, but because Hayes did not move as quickly as expected in releasing telecommunications software that works on the Macintosh.

Well, wait no longer. Hayes has overcome its inertia in a big way with a Macintosh version of its Smartcom II program. This program merges the capabilities of the original Smartcom II with the mouse- and icon-driven environment of the Macintosh. The result is a powerful telecommunications package that offers a multitude of features in an easy-to-use format.

Smartcom II runs a series of seven icons—a telephone, printer, disk, closed envelope, open envelope, pencil, and question mark—along the bottom of the screen. They control most of the routine on-line functions. Several pull-down menus—Connection, Settings, Autopilot, and Special—are at the top of the screen and control the added features.

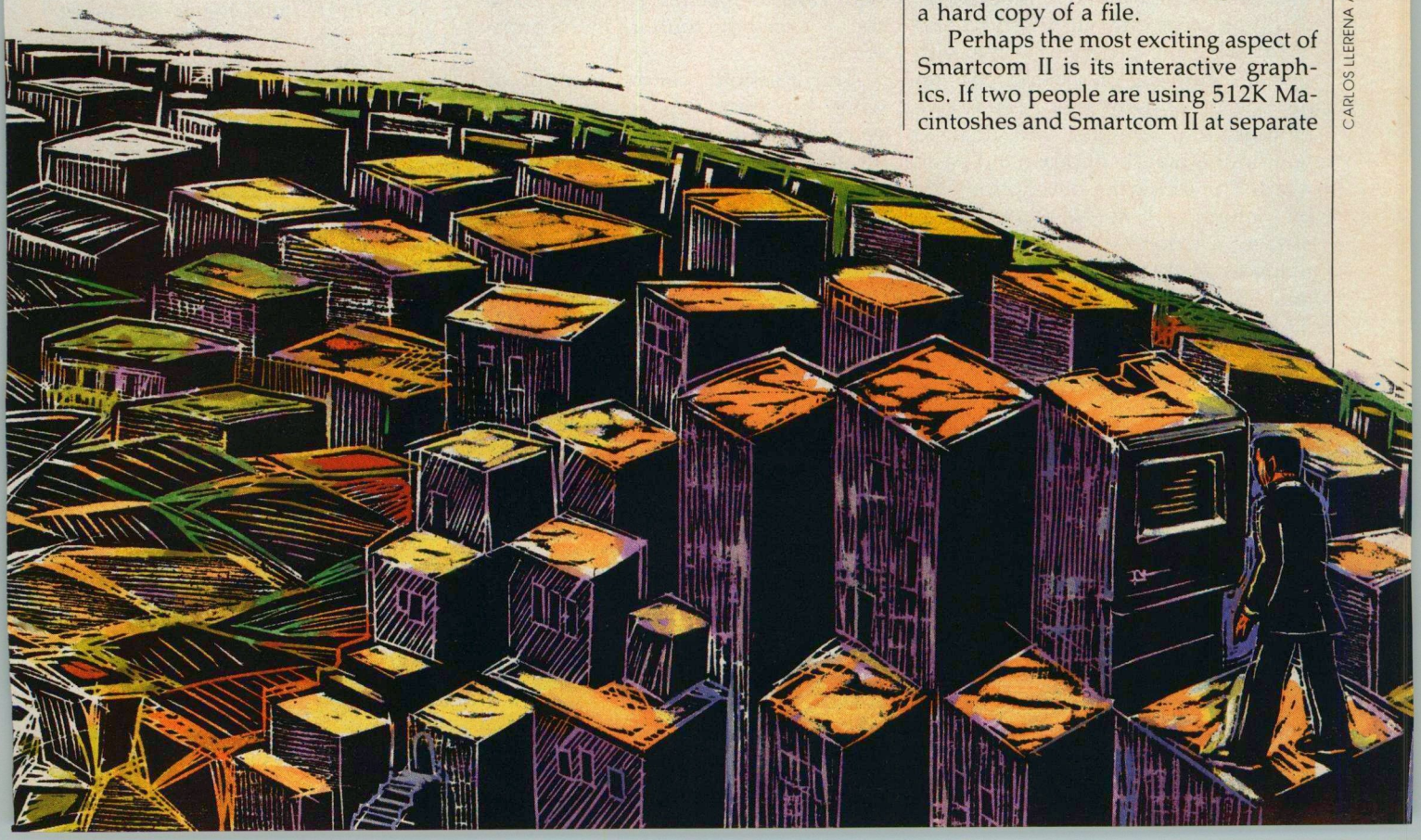
Perhaps the most exciting aspect of Smartcom II is its interactive graphics.

The fastest way to log onto a system is to click on the telephone icon. A Dial box appears on the screen. You point and click on the telephone numbers and then click on OK. A Call Progress box lets you know the status of your call, from setting up Smartmodem to connecting with a telecommunications service.

If you log onto CompuServe, The Source, BRS, or other services regularly, you want one-click access. Smartcom II allows you to create "communications documents," files stored on disk with the appropriate modem parameters, terminal type, and transmission protocols. These documents, coupled with the Autopilot (customized macros) feature, allow you automatically to log onto an information service and perform repetitive commands (see "Auto-Log-On Tutorial" sidebar for information on creating Autopilot files). Even better, you can automatically log on at a predetermined time and react to certain conditions—without monitoring the computer.

One of the major reasons for subscribing to an information service is to upload disk-based data and download incoming data from a service. Smartcom II provides both capabilities. Transmitting or receiving a file is as easy as pointing and clicking, and clicking on the printer icon produces a hard copy of a file.

Perhaps the most exciting aspect of Smartcom II is its interactive graphics. If two people are using 512K Macintoshes and Smartcom II at separate



CARLOS LLERENA AGUIRRE

Auto-Log-On TUTORIAL

In evaluating the four telecommunications programs, I wanted to perform a simple, yet effective, real-world test: create an auto-log-on sequence to dial the local number automatically, provide ID and password, and log onto CompuServe. I wanted the sequence to require only one or two clicks of the mouse.

If you already have a modem and have fathomed the auto-log-on sequence of the software, then you can probably skip this combination comparison test and tutorial. If not, you may want to learn what it takes for each program and, when you buy a modem and software in the future, refer back to this article and save yourself time and effort.

Now that you have the impression that we're about to move mountains, you'll be pleasantly surprised to find out that all the programs come with several auto-log-on sequences on disk. Some of them require extensive modification, however, and all need your individual ID number and password. The following descriptions are by nature and necessity cursory—after all, we don't want to rewrite the manuals in these pages—but, coupled with the screen shots in figures 1–10, they should help you discern how easy or difficult the auto-log-on process is for each program.

Hayes Smartcom II

The easiest program of the four to manipulate practically programs the sequence for you (see figure 1). The Autopilot feature places icons across the bottom of the screen. Each icon stands for a command. For example, the telephone icon represents "Dial. Cancel Autopilot and hang up if no computer connection results." Creating the sequence is a matter of pointing to the correct command and clicking the mouse. When the program prompts you, you fill in the ID number, password, and other specific

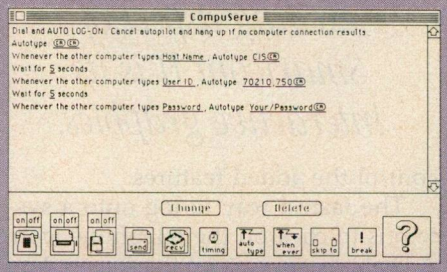


Figure 1: Smartcom II auto-log-on sequence

keystrokes. The procedure is fast, easy, and simple.

Prometheus ProCom-M

This sequence is not as easy to set up as Smartcom II's. In effect, you are creating a miniprogram, complete with calls to specific "routines." The trick is to call the routines in the proper order.

The creation process is a lot of work, but once you get through it, you can ignore the process of logging on forever. The multitude of windows and items makes it all the more difficult. Fortunately, the manual explains the procedure completely (after you do some flipping around).

First you alter the communications setting and then create an entry in the directory (see figure 2). Next, you line up the macro sequences (see figure 3), making sure that the prompts that the program is looking for correspond to the actual prompts of the telecom-

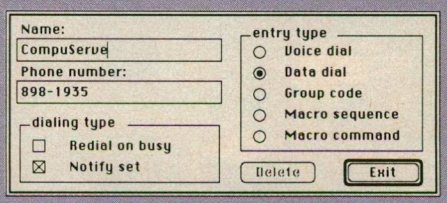


Figure 2: ProCom-M auto-log-on sequence, step 1

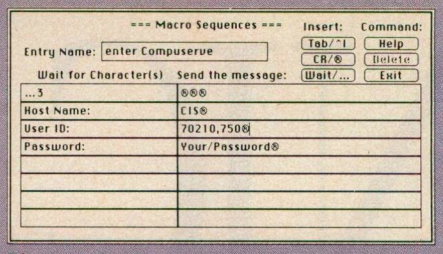


Figure 3: ProCom-M auto-log-on sequence, step 2

munications service. Last, but certainly not least, you set up the macro command (see figure 4) to complete the auto-log-on sequence. The Macro command calls the specified directory

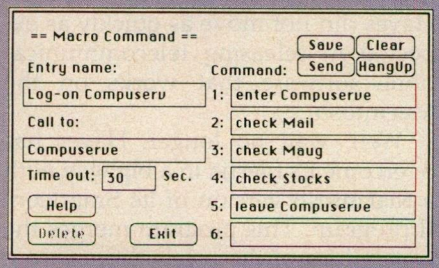


Figure 4: ProCom-M auto-log-on sequence, step 3

listing and then performs the macro sequence.

Mainstay Telescape

The overall organization of the auto-log-on procedure is well thought out, but the execution tends to be more complicated than necessary. This situation in itself is tolerable, but the manual confuses more than it clarifies.

Naming the auto-log-on sequence is simple enough (see figure 5), and, as with the other programs, setting the communication parameters is easy and fast (see figure 6). At this

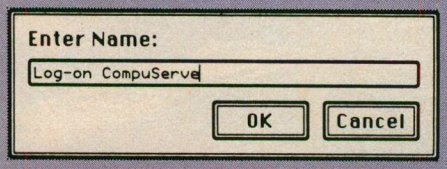


Figure 5: Telescape auto-log-on sequence, step 1

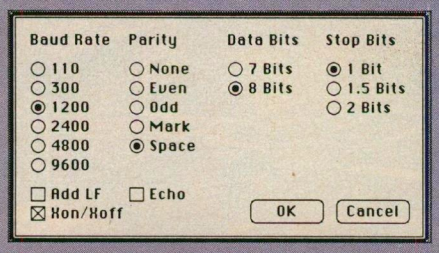


Figure 6: Telescape auto-log-on sequence, step 2

point, all semblance of English breaks down, however. The actual macro initially looks like hieroglyphics (see fig-

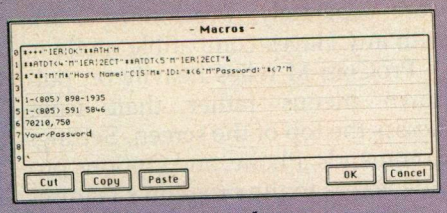


Figure 7: Telescape auto-log-on sequence, step 3

ure 7). In essence, you have to write a five-line program, with one line (1) as the main auto-log-on sequence, four lines (4–7) to hold necessary information, and one line (0) to cut off the connection. If you need a terminal emulator, you can fill in the last screen (see figure 8).

The syntax is likely to give you trouble, at least until you have a few macros under your belt. The pro-

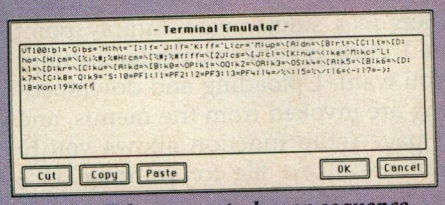


Figure 8: Telescape auto-log-on sequence, step 4

gram's open-ended flexibility provides great versatility, but without a more precise manual, all the program's features remain untapped.

Palantir inTouch

InTouch offers almost as great a challenge as Telescape. Integrating function keys into the auto-log-on sequence is no easy feat, but the difference between the two programs is the documentation. The Palantir manual provides a good explanation of the process.

Creating a macro means you must use the specialized language of the program. Smartcom II places icons across the bottom of the screen; inTouch, instead, uses precise commands. Once that you have set the communications parameters, you must type a few short lines to tell the program to wait for certain characters and respond with particular character strings (see figure 9). If you want to

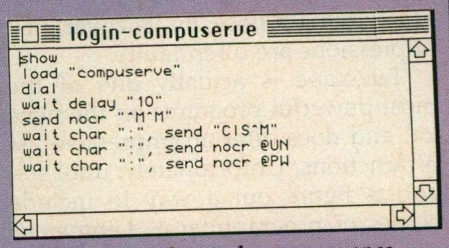


Figure 9: inTouch auto-log-on sequence

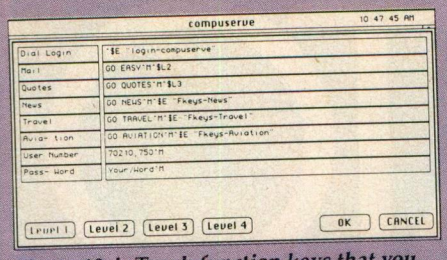


Figure 10: inTouch function keys that you can integrate into the auto-log-on sequence

get fancy, you can access a function key, although these are more useful after you've logged onto a service (see figure 10).

Conclusions and Conditions

Looking at the auto-log-on sequences side by side reveals characteristics of the programs themselves. Smartcom II is the easiest to use, and Telescape is by far the most difficult. ProCom-M and inTouch are in between, although I give inTouch a slight edge.

PRODUCT INFORMATION

Smartcom II
Hayes Microcomputer Products
P.O. Box 105203
Atlanta, GA 30348
(404) 449-8791
List Price: $149
Requires: Macintosh (512K for interactive graphics), Hayes-compatible modem

ProCom-M
Prometheus Products
4545 Cushing Parkway
Fremont, CA 94538
(415) 490-2370
List Price: $99
Requires: Macintosh, Hayes-compatible modem

Telescape and **Turbo Download**
Mainstay
28611B Canwood Street
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(818) 991-6540
List Price: Telescape, $125; Turbo Download, $39.95 ($10 for Telescape owners)
Requires: Macintosh, Hayes-compatible modem

inTouch
Palantir Software
12777 Jones Road, Suite 100
Houston, TX 77070
(713) 955-8880
List Price: $145
Requires: Macintosh, Apple or Hayes-compatible modem

locations, both can work on one drawing. This Canvas feature of Smartcom II functions like a subset of MacPaint, with Draw, Erase, Line, Box, Cut-and-Paste, and Text functions. As one person draws, the other person sees the image instantly. You can create graphics from scratch or from an existing picture copied from the Clipboard.

Only one person may draw at a time, though. The commands are Pick Up, to start drawing; Put Back, to stop drawing; and Request, to ask for control of the canvas. You can send messages by actually writing on the canvas or choosing the A icon and typing on the canvas. Any graphics created with Smartcom can be integrated into MacPaint and MacWrite files.

An interactive chess game, similar to the interactive graphics feature, is included for the enjoyment of Mac 512K owners.

On-line help is always available and is sufficient to jog your memory about a particular function. More extensive information is available in the accompanying manual, which, incidentally, deserves high marks for clarity and organization.

Overall, Smartcom II is an excellent telecommunications program for the Macintosh. It uses the mouse and icons for speed and flexibility. For Macintosh 512K owners, the interactive-graphics feature proves to be especially appealing. The ability to exchange text *and* graphics is a big step in the right direction for the evolution of telecommunications. Hayes deserves a hearty pat on the back for putting this feature into Smartcom II.

Smartcom II is arguably the easiest of the four programs to use. Whether you own a 128K or 512K Macintosh, we recommend that you give it a serious look. Pairing it with a Smartmodem (300, 1200, or 2400 bps) will give you and your Macintosh a flexible telecommunications system for instant access to a world of information and convenience.

Prometheus ProCom-M

Prometheus Products, another big name in the telecommunications industry, bundles its ProCom-M program with its ProModem 1200 and 2400 modems. As a result, instead of buying a modem and then spending extra cash for a telecommunications program, you get a complete telecommunications system right out of the box. You can also purchase the soft-

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ware separately; ProCom-M works with any Hayes-compatible modem.

ProCom-M relies heavily on pull-down menus rather than icons. Across the top of the screen, Settings, Commands, Phone, and Options provide access to the program's features.

Adding a phone number to the directory is as easy as pulling down the Phone menu, clicking on Directory Add, and filling in the information. Note that the directory may contain both voice and data telephone numbers, which goes a long way toward making your computer an integral part of a workstation, rather than just being a data-processing station. As a bonus, you can use the Phone Log function, which keeps track of all the calls you place.

You set communication parameters in a similar way. Simply point and click on the particular settings you want. Uploading and downloading are invoked from the menus, and a page-setup function allows you to prepare a text file for printing once you are off-line.

ProCom-M allows you to transfer MacPaint files and binary files between two connected Macintoshes with the Xmodem protocol. The process is fairly easy.

Prometheus earns very high marks for its 150-page manual. All the information you need is here, and step-by-step, illustrated instructions help speed your way into the telecommunications world. About the only nit I can pick with the documentation is the extremely small size of the type.

ProCom-M is a powerful program and contains all the features and functions you expect in a telecommunications program. Perhaps its best aspect is that it comes bundled with the Prometheus modem, so you don't have to lay out extra cash.

Mainstay Telescape

First impressions of this program are that it leaves a lot to be desired. Telescape seems to lack many features that should be standard in a telecommunications package. Yet, like judging a book by its cover, first impressions are often faulty.

Telescape is actually one of the most powerful programs on the market and does offer an impressive list of functions. Unfortunately, until scientists figure out a way to include clones of programmer Y. Lempereur with each package, or until Mainstay hires a sharp technical writer to do

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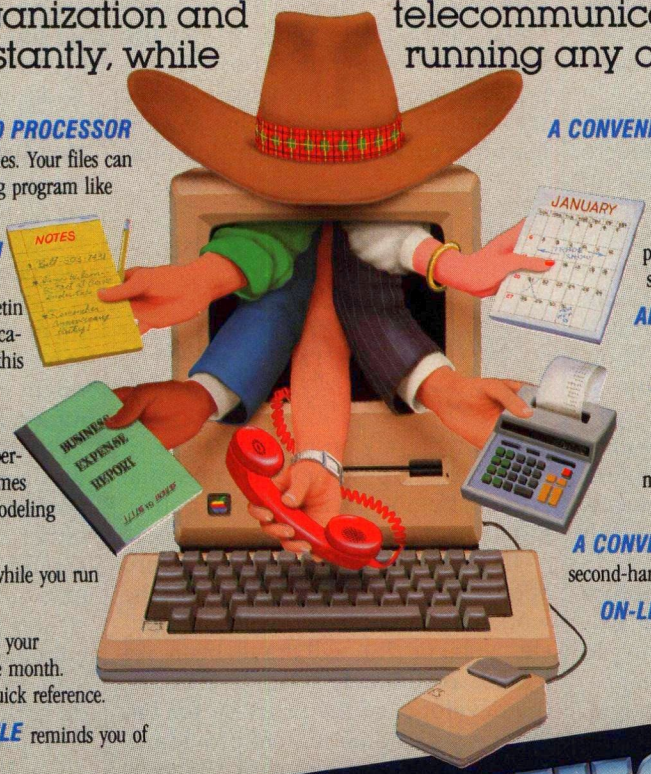

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the documentation, invoking all the features the program offers is likely to be an exercise in intuitive thinking.

Like the other programs, Telescape makes full use of the mouse- and icon-driven environment of the Macintosh. Pull-down menus and some icons offer flexibility for changing parameters and for performing other simpler tasks.

Initiating a connection proves to be easy and fast—a couple of points and clicks. You get into trouble when you start to do something beyond simple communications. The auto-log-on sequence (see "Auto-Log-On Tutorial") is beyond belief. Experienced users may find the Macro Command Language not too difficult to manipulate, but novices will be taken back by its complexity.

Once you do figure out how to use the program, you can upload and download ASCII and binary files. In fact, in order to demonstrate these features, Mainstay runs its own bulletin-board system (BBS). The program's binary file, DEMO3D.BIN, a three-dimensional, rotating drawing of the Macintosh, is available and well worth downloading.

Telescape has proprietary graphics instructions, called the Graphic Applications Language, to send simple drawings that use four basic shapes: rectangle, oval, rounded rectangle, and arc. Creating such graphics is confusing at best, and the four-shape restriction limits this feature. The Hayes process of using MacPaint interactively is much more elegant and practical, if a bit slower to send.

Mainstay also includes a rudimentary electronic-mail/message feature that functions much like a BBS does. It has two levels of password protection, and callers can upload and download messages by using the XMODEM or MacBinary protocol.

Mainstay also offers a desk accessory, Turbo Download, that downloads a file, using the MacBinary protocol, up to 40% faster than normal at 1200 bps. You get this speed improvement because Turbo Download tells the sender ahead of time that the information is received correctly, so the sender never waits for your computer to acknowledge that the information was received correctly. Although you will receive your files more quickly, the file transfer aborts if an error is detected.

Those of you who need terminal emulation should pick up Telescape immediately. Mainstay's Terminal Emulation Language does precisely that—and I mean any type of terminal. Several are provided on disk, and modifying those or creating new ones is straightforward once you understand the process.

The weakest link of Telescape is the documentation. In a word, it is horrendous. The casual manner in which it instructs you proves to be frustrating and disheartening. Telescape has a lot to offer, if you can learn how to tap into its power.

Telescape offers many features and was once at the top of my list, but the learning curve is too steep for most people who rely on manuals to learn how to use a program. The potential is great, but the package needs polish.

Whichever you choose, make sure the software will do what you want it to do.

Palantir inTouch

In planning this article, we heard about a new version of inTouch in the works. By the time you read this article, Version 2.0 will have been released. Fortunately, George Cowsar, the developer of the program for Palantir, was kind enough to provide us with a prerelease copy of the new software—complete with dot-matrix printout of the manual.

Prerelease or not, inTouch is an excellent program, powerful and versatile, yet relatively easy to use and not overwhelming to learn. It uses pull-down menus to good effect, and establishing a connection is a matter of pointing and clicking.

The program's built-in Communications Command Language provides a powerful tool for setting up auto-log-ons and other macros. The commands appear in English and are easy to follow.

One of the most impressive features of this program is a set of programmable function keys that record a sequence of keystrokes. These gems increase the value of the program by saving you time. For example, you can set up a function key with commands to bring you a frequently visited service within CompuServe or set up a sequence that downloads information automatically. Indeed this program's flexibility is limited only by the imagination of its user.

Uploading and downloading ASCII or binary files present no problems. inTouch also emulates a variety of popular terminal types, as well as a graphics-terminal standard called VIDTEX.

The program's illustrated documentation proves to be as good as the other manuals. The examples are clear and easy to follow, and I had no significant problems hooking into an on-line service.

All in all, inTouch is an intelligently designed telecommunications program that fulfills the promise of simplicity and power. It is easy to learn and easy to use, and the documentation really helps you hurdle its tricky aspects.

Decision, Decisions

So, which one will it be? All of them do about the same thing in the same way, although a given program might contain features that are missing on another.

Perhaps you should start the other way around—eliminate those you do not need. If you need emulation of an esoteric terminal, then Telescape should be your first choice. If not, pass it by until Mainstay delivers a clearer manual. The other programs emulate the popular terminals.

If you buy a Prometheus ProModem, then you already have an excellent program and should need no other. In fact, the software is a big inducement for buying the hardware.

That leaves Hayes Smartcom II and Palantir inTouch for those who are looking for an additional telecommunications program. These two programs are evenly matched. On the one hand, Smartcom II is the easiest to use of all four programs and has that interactive graphics features. On the other hand, inTouch is more powerful yet takes time to learn. Either would be an excellent addition to your software library.

Whichever you choose—Hayes Smartcom II, Prometheus ProComM, Mainstay Telescape, or Palantir inTouch—make sure the software will do what you want it to do. The best way to find out is to contact the company for more information. ✚

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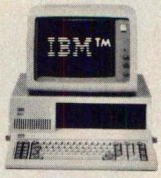

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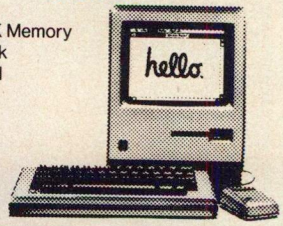

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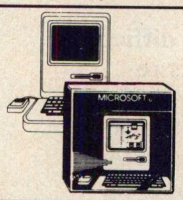

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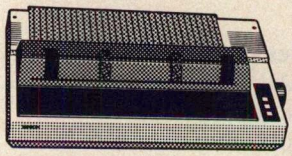

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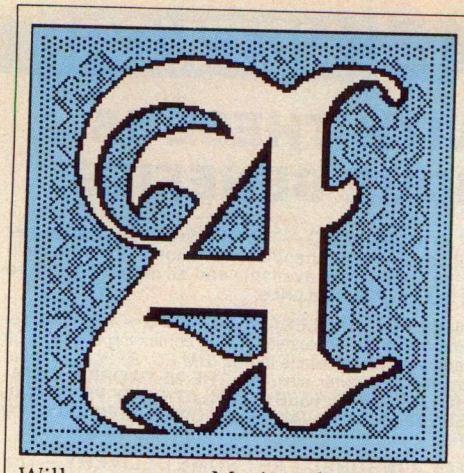


Commercial font packages that let your Macintosh do everything from poster printouts to writing in Rumanian

FROM LONDON TO CAIRO

PART II

Will your next Macintosh-produced flier announce a sale? Well, don't just type s-a-l-e; proclaim a **SALE!** Use a bold, eye-catching font—36-point should do it. Perhaps the invitations you're about to send would be more impressive in a fine calligraphic script. Whatever font you need, chances are that someone has designed it for the Macintosh.

Last month we gave you a brief description of Macintosh typography. This month we'll look at commercial font packages and give you some hints on using them.

Fonts, Fonts, and More Fonts

Soon after the Macintosh appeared on the scene, it seemed that everyone who attended a users'-group meeting had a new font to show. Created by people who were not necessarily trained in art or typographic design, some of the fonts were good, most were bad, and a few were simply ugly. Happily, the quality of fonts available for the Mac has improved, and commercial packages are now available for general as well as specialized applications.

As we talk about fonts for the Mac, we'll be categorizing them as follows: Text fonts are those that are primarily for traditional word processing, such as letters, articles, and books. They should be attractive, but not at the expense of legibility. The Mac's Geneva and New York are text fonts.

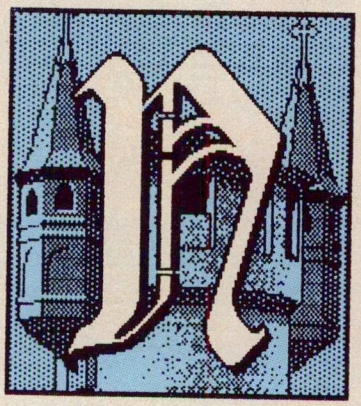
Display, or headline, fonts are large text fonts for posters, headlines, and so on. The Macintosh does not come with a special display font, but a 24-point Geneva bold fits this classification.

Decorative fonts are usually larger than text fonts and fancier. Decorative fonts are generally not as easy to read and should be used sparingly on posters, fliers, letterheads, and anywhere else that you want a special effect. London is a decorative font.

We've put foreign alphabets; fonts for scientific or mathematical notation; and picture, or symbol, fonts in a category of their own called specialized fonts. These fonts are designed for a specific purpose. Cairo is a specialized font.

ClickArt Letters

This package is a must if you need large letters. The 24 alphabets, in 24-, 36-, 48-, and 72-point sizes, are especially suitable for fliers, posters, and overhead transparencies. Each of the alphabets is either a font or a display typeface (stored as a MacPaint file). ClickArt Letters has 15 fonts and 6 display typefaces in all. The display typefaces are alphabets whose letters are larger than what is possible in font form (as large as one inch high), so they come as outlined letters in MacPaint files that you can cut and paste. The fonts have no icons or Option-key surprises; each is a complete alphabet with numerals.



ClickArt's documentation, a one-page flier, contains samples of the alphabets and some tips for using them. (You may need a magnifying glass to read it.)

DecoWriter Fonts and Letters

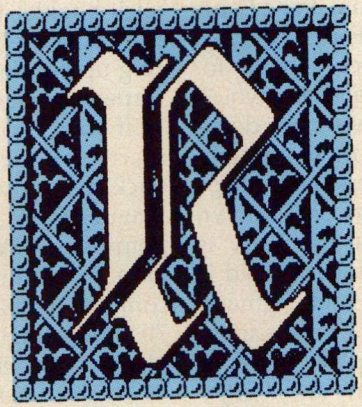
If you'd like to use your Macintosh to create illuminated manuscripts, this set is for you.

DecoWriter Fonts contains only 13 fonts, but they're attractive decorative fonts ranging in size from 14 to 48 points. The disk comes with font files and a copy of Apple's Font Mover utility. For those of you who can't wait to start using the fonts, DecoWriter's disk also contains a System file with all the fonts installed. Move the System icon onto your MacPaint disk (not MacWrite, since nine of the fonts are 36 points or larger), and you're ready to go.

AbbeyDeco is a Celtic font (the lettering style used in medieval manuscripts). Use this font together with the letters from DecoWriter Letters, and you should get impressive results.

DecoWriter Letters contains 52 MacPaint documents. Each document consists of one large, outlined capital letter (measuring approximately 1½ × 1¾ inches) and a decorated rectangular background on which to set the letter. Twenty-six of the letters are "Roman," and 26 are "Gothic."

The rectangular backgrounds vary. You get a castle, a globe, a checkerboard, a goblet, op-art patterns, and so on. As a calligrapher and a traditionalist, Roberta would have liked to see more of the classic illuminated backgrounds such as dragons, knights, and so on, instead of the sailboat, the elephant, and the many optical-art designs.



The illustrated manuals come along with samples of the alphabets, images, and suggestions for their use.

Fluent Fonts

Fluent Fonts is a two-volume set of text, decorative, display, and specialized fonts. Art Nouveau, Calligraphy, and Canterbury are three of our favorites. Bodoni, whether 9-point or 36-point, is an effective text font. Specialized fonts include ASCII, in which each letter looks like a keycap with its ASCII number below it; Mazel Tov, which is the English alphabet but appears to be Hebrew; a Russian alphabet; a font of circuit symbols; and a font of astrological symbols. The package also includes border designs and a picture font. Teeny and Tiny are text fonts with letters as small as they can be while retaining legibility. Script, unfortunately, leaves much to be desired. The letters look as though a right-handed person had written them with his left hand. The other fonts are clean and well designed.

The package comes with a good reference manual that includes samples of each font.

FontAGENIX

Originally advertised as FONTastics, this two-disk collection of 21 fonts is the most diversified one we've seen. The typefaces are not particularly attractive; in fact, some fall into the Ugly category, but the uniqueness of the specialized fonts and the tremendous variety of icons might be just what you need for a particular project.

Specialized fonts include Novosibirsk, a serif font that contains the entire Cyrillic alphabet, including many characters that are obsolete in modern Russian. The Prague font contains special characters for writing in Bohemian (Czech), Slovak, Slovene, Polish, and Rumanian; the Trizekh font has characters for writing in Esperanto.

Baton Rouge has images of measuring cups, spoons, and other symbols that are useful for preparing recipes or cooking instructions. Oxford contains medical symbols for writing prescriptions and medical reports, and Williamsburg is designed to look like sampler stitchery.

In addition to providing other text and decorative fonts, FontAGENIX offers two fonts for creating an extraordinary variety of borders.

Kudos goes to Devonian Software for providing, on each disk, MacPaint documents with samples of every font in the collection. In the few moments that it took to print out the 11 documents, we had a collection of reference sheets that show not only each character in the font, but also the keys to press for special characters.

Headline Graphics!

This package is not a collection of font files. It contains MacPaint documents of display-character sets that might be useful for creating posters,

Figure 1: A sampling of some of the many fonts available for your Macintosh

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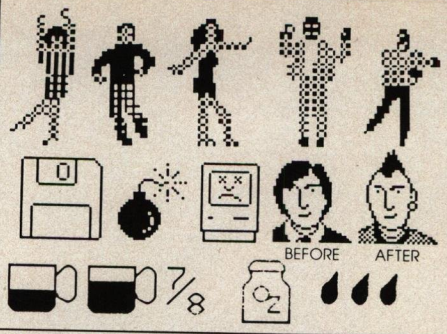

Figure 2: Samples from UltraFonts' symbols font and FontAGENIX's Baton Rouge

signs, fliers, and so on. The 18 alphabets are strictly for fun.

Trains has each letter set in a silhouetted train car. The locomotive has no letter. Woody is an alphabet made up of pieces of wood that look nailed together. Pipe Dream's letters are made of—you guessed it—pipes (the plumbing kind).

Kensington Professional Type Fonts

Professional Type Fonts For Text and Professional Type Fonts for Headlines are the packages you'll want if you're interested in documents that closely resemble typographers' output. Professional Type Fonts are styled after well-known typefaces. Epsilon, for example, is styled after Optima; Omicron Bold is based on Futura Bold; and Sigma is styled after Helvetica. Professional Type Fonts For Text contains a disk of 16 12–24-point text fonts and a copy of the Apple Font Mover. Professional Type Fonts For Headlines has two disks with a total of 16 24–72-point display fonts and a copy of Apple's Font Mover. Headline fonts, because of their size, work only on 512K Macs. Each package comes with a comprehensive 70-page manual.

Kensington's fonts do have a drawback. To achieve the proper proportions in the emulation of the original type, these fonts have been designed inconsistently with the Mac's fonts. The result of this inconsistency is that you can't use the fonts with the high-quality-printing option in MacWrite. To print in the High Quality mode, you must remove the second-size font from the System file.

Mac the Knife: World Class Fonts!

This collection of 26 fonts is classy. Each font has a Shift-Option-tilde icon character and a country's flag, as well as other icons. Most of the fonts provide a printer's "em", as well as a bold underline character. A row of the em characters, underlined, gives you "Oxford rules." Many of the fonts can produce stacked fractions.

Among the Mac the Knife fonts is Babylon, a tiny typeface available in two sizes equivalent to 4-point and 8-point. These typefaces are useful for faking type when you're designing a graphic and want to indicate where copy should appear. Kawasaki and Tokyo are comparable Japanese-style fonts, but Tokyo contains the Japanese standard international character set, and Kawasaki gives you the Japanese Katakana character set. Manhattan is the original Mac's New York font, enhanced with Option-key characters of all the Macintosh icons: paint bucket, hand, and so on. Paris and Montreal are text fonts that feature ligatures (two connected characters that you type with a single keystroke.) Boise and Camelot are decorative fonts.

World Class Fonts! comes with a slick booklet that contains font samples and useful information on setting up your application disks.

SuperFrench German Spanish

If you need foreign characters and diacritical marks, you're in luck. This package lets you type more than 77 languages in 10-, 12-, 20-, and 24-point sizes. With one font, you get French, German, Spanish, and the complete character sets of more than 70 other languages, including Albanian, Czech, Finnish, and Hawaiian.

The inclusion of 41 overstrike keys with automatic nondeleting backspacing allows fast insertion of accents, umlauts, and other diacritical marks over or under any letter in the font. Just as you would when writing, you type the letter first, and then you type the accent.

The disk comes with a utility to transfer the fonts into the System file of your application disk, a users' manual, and a laminated keyboard-layout sheet.

The font can print out on the LaserWriter (see TECH: for Math/Science Equations, below).

Linguists' Software will soon be releasing SuperGreek, SuperHebrew, Hebrew & Phonetics, MacCyrillic, MacKana & Basic Japanese Kanji, and Macintosh MacKorean.

SuperFonts

This collection of 16 typefaces is mostly decorative fonts. Relief is an interesting font that gives the appearance of embossed letters. Other fonts include versions of the classics: Baby Teeth, Stencil, and Broadway. Text fonts come in a variety of sizes.

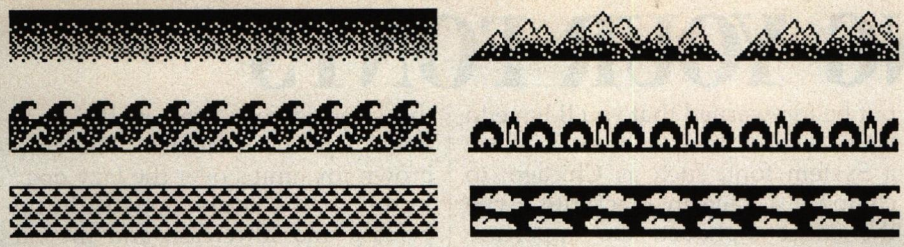

Figure 3: Sample borders from Fluent Fonts' Borderline font

TECH: for Math/Science Equations

TECH is a specialty font with more than 1000 different symbols for physics, mathematics, engineering, economics, and astronomy. According to its maker, Linguists' Software, this font was produced in consultation with top scientists from NASA, Lockheed, and Harvard.

The font comes in six sizes from 9 to 24 point. It can print out on the LaserWriter, which gives a more precise character line than the ImageWriter does. Since TECH is not specifically designed in PostScript for the LaserWriter, you have to install it into the LaserWriter's System file, and it takes more time to print out.

UltraFonts Edition two

The 21 fonts in this package are well designed. The text fonts include the extra accents you need to type in a variety of languages. UltraFonts has changed the way you access characters from the keyboard. For example, the period and comma are in the Shift position to simplify the typing of acronyms. (With the Mac's fonts, if you abbreviate New York with periods, you get N>Y> unless you release the Shift key. With UltraFont's layout, you don't have to release the Shift key to type N.Y.) You can access directional quote marks and apostrophes in the unshifted and shifted positions. Printers' bullets as well as printers' spaces are in all the fonts, the em space is as wide as the height of a capital letter, the en space is half the width of the em space, and the thin space is one pixel wide.

Along with a variety of attractive text and display fonts, you get a border font, as well as a symbols font that includes trees, Mac icons, and a charming assortment of people in different positions.

A simple pamphlet includes tips, samples of each font, and an UltraFont keyboard that shows the distribution of the characters.

Summing Up

It's impossible to say that one particular font package is the one to get. In actuality, you can get by with just the fonts that come with MacWrite or MacPaint. Getting more fonts is, if you'll pardon the cliché, adding icing to the cake. We love icing! Lots of it!

We tend to favor Mac the Knife's Fonts!, UltraFonts, and Fluent Fonts. These collections are diversified and well designed. For attractive headline fonts, without gimmicks, ClickArt's Letters can't be beat. Without a doubt, each package has at least one font that you'll want to use.

Add to the packages we've mentioned at least two new font packages that were announced but not yet available for review—and many fonts in the public domain—and you can see that the problem is not only which fonts to get, but how to use them effectively. Read on for some hints.

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CIRCLE 230 ON READER SERVICE CARD

FILING YOUR FONTS

If you're like us, you'll probably end up with many disks of fonts: some commercial packages; some fonts from friends, colleagues, or users' groups; and perhaps some that you've created yourself. Generally, you won't need to keep all the fonts, especially the large display and decorative ones, installed on an application disk until you need them. The goal, then, is to be able to locate a particular font quickly. One way to organize your collection is by type: decorative fonts in one file; text fonts in another; and headline, or display, fonts in yet another. If you do this, you'll need a listing of each font file's contents, which is easy to create. From the desktop, click on the font file and then select the Get Info option from the Edit menu (see figure 4). In the text area at the bottom of the window, type the name of each font in that file.

A better way to organize your files if your collection is growing is to keep each font, in its various sizes, in its own file (see figure 5). One file, for example, might contain 10-, 12-, 14-, and 18-point New York.

Make a Font Catalog

Unless you have a photographic memory, you'll find it difficult to remember what each font looks like. For important projects, you may want a particular typeface that has just the right width, spacing, and so on. We've found printouts of each font to be a necessity. Unfortunately, publishers of font collections don't always provide hard copies. Most show reduced, and thus innaccurate, samples in their users' manuals, and some provide none.

Create sample sheets for yourself, but be forewarned that you'll have to spend a lot of time. One way is to use a System font, such as Chicago, to compose a page in MacWrite. Type the entire alphabet: the uppercase and lowercase letters, the numerals, and all the special characters. Save the document as FontSample. Select the entire document by clicking before the first letter and Shift-clicking at the end of the document. Go to the Font menu and select a new font. The entire document will then appear in that font. Type in the name of the font, the size, and the name of the font collection it came from. Use the Save As option to save the document under a new name. Repeat this procedure for every font you own. To do it, you must have all your fonts installed. Phew!

With the variety of fonts available, the Macintosh is as exciting today as it was when it was first introduced.

An easier way to create a font catalog is to use the Fontastic Font Editor from Altsys. This approach is less tedious and time-consuming, because you don't have to install the fonts into a system; the editor can read the fonts directly from your font files. Open the editor, put in a disk of font files, select a font, and choose Edit from the menu.

The program presents you with a sample window screen that shows the selected font used in the traditional alphabet sentence "The quick brown fox jumps over the lazy dog," as well as the entire alphabet in uppercase and lowercase and the numerals. You can enlarge the sample window to full-screen size, type any other characters you want to see, and then do a screen dump of the window by keying in Shift-⌘-4. After each dump, close the Edit window, select a new font, and click on Edit, and the new font will appear on the sample screen in exactly the same display as the previous one.

No matter which method you choose, try to do it as soon as you get a new collection of fonts, rather than waiting until you have so many that the task becomes formidable. Keep your printouts in a binder, and you'll never have to *guess* which font will be best for a particular project.

Using Fonts

Fonts come in font files. Before you can use a font, you have to install it on the System file of an application disk such as MacPaint or MacWrite (see "From London to Cairo, Part I," *A+*, December 1985, pages 187–194). When deciding which fonts to install on an application, consider the amount of disk space each font occupies. On the average, a 12-point font takes up about 3K, and a 36-point font can take up as much as 13K or more. Even if you use very small fonts, a font is useless to you if you can't select it from the application's menu. MacWrite and MacPaint display 20 fonts in their menus. Three of these must be Chicago, Geneva, and Monaco (the System fonts), so that leaves room for 17 fonts of your choice. Other applications, such as

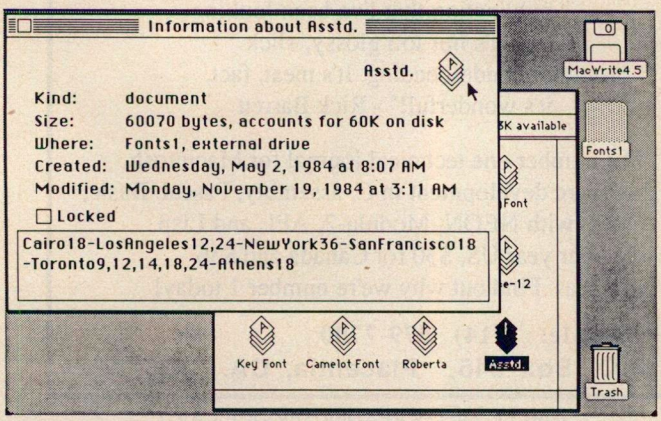

Figure 4: Use Get Info from the Apple menu to enter information about your font files.

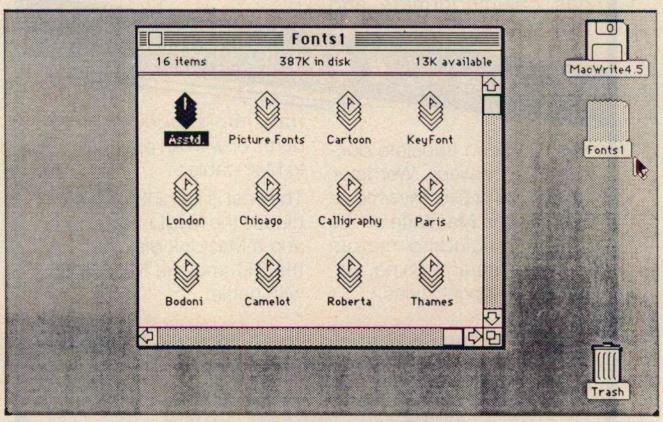

Figure 5: A good way to organize your files is to keep each font, in its various sizes, in its own file.

MacDraw, display fewer.

Consider which fonts you need for particular applications and create several versions of various applications with different fonts on them. For example, we have ten disks with MacWrite, each with a different font collection. One, A+ MacWrite, has just the basic fonts: New York, Geneva, and Monaco. Another, Correspondence MacWrite, has a variety of script fonts. Fun MacWrite has a few large decorative fonts such as Camelot, Art Nouveau, and Old English. Picture MacWrite has a variety of border and pictorial fonts such as Cairo and Taliesin. Our MacPaint disks are configured in a similar way. By the way, you can use fonts larger than 24 points in MacPaint and MacDraw, but not in MacWrite.

MacWrite, MacPaint, and Fonts

When you create a MacWrite document with different fonts, you must use a disk that has those fonts installed on it when you edit or print the document. Any font that isn't in the System file will be replaced with the Mac's System font, Geneva. Once again, take advantage of the Macintosh's Get Info window. From the desktop, click on your document, open the Get Info window from the Edit menu, and type in the name and version of the application (e.g., MacWrite 1.4) you used to create the document.

You print MacPaint documents differently than you do MacWrite documents. Once a MacPaint document is saved, it prints faithfully, no matter what fonts are in the system. If you use a particular font only for a letterhead, logo, or other unchanging copy in your MacWrite documents, it's best to create a Scrapbook image of it. Then you can paste it into your document whenever you need it, and you won't have to worry about having that special font in MacWrite when you print your documents.

One final consideration when you install your fonts in MacWrite: When you do a high-quality printout, the Mac checks the font to be printed and looks for the corresponding font that is twice the size; it then combines the information from both fonts to produce the high-quality characters. Apple and most font publishers have created their fonts so that, from size to size within a font, the characters are mathematically proportioned to work with the high-quality print function. For better printouts, install your font in the size you'll be using and, if it's available, the next-larger size of the font.

Start Writing

With the extraordinary variety of fonts available, the Macintosh is as exciting today as it was when it was first introduced.

Whether you want to create bulletins, posters, newsletters, invitations, notes, letters, transparencies, slides, articles, or books, you can do it with the Macintosh. And you can do it in Swahili! ✚

Robert Schwartz and Michael Callery are the authors and illustrators of Apple Graphics: Tools and Techniques *(Prentice-Hall, 1985).*

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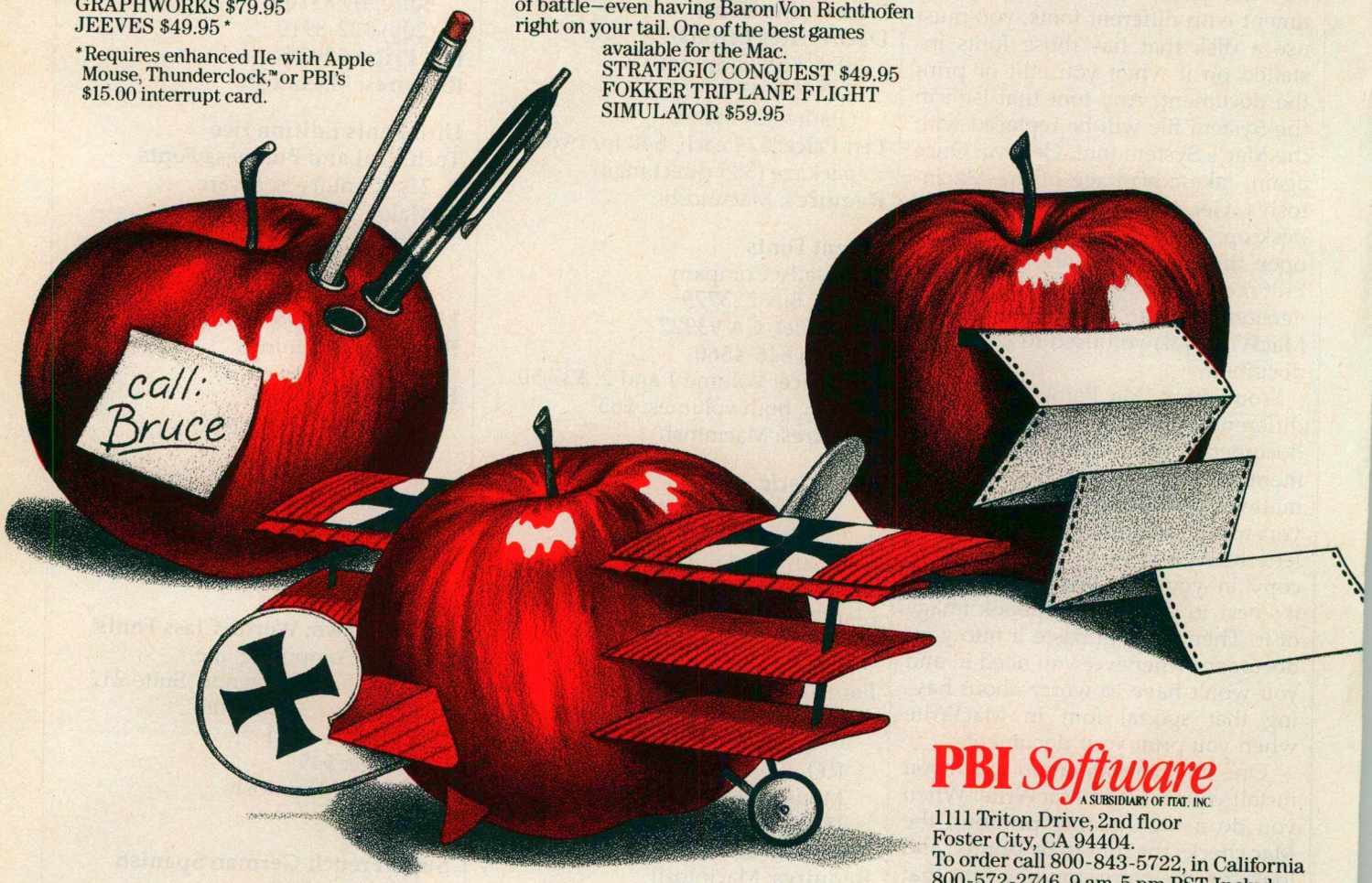

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CIRCLE 242 ON READER SERVICE CARD

MacTips

Suggestions from our readers

QUICK PRINTOUTS

If you don't like the long waits required to list Microsoft BASIC 2.0 programs on your ImageWriter printer, then place the following BASIC statement on page 1 of your Note Pad accessory (see figure 1), whence you can subsequently copy them to the Clipboard and paste them into the Command window to facilitate a rapid listout of your program, complete with date and time annotations.

Keywords are not boldfaced in the resulting printout, but the job is completed far more quickly and uses less paper than listouts you obtain by selecting the Print option from the File menu.

Gary Salsman
Panama City, FL

A WELCOME MESSAGE

Many Macintosh users are now familiar with the public-domain program Screenmaker. This program allows you to substitute the *Welcome to Macintosh* start-up screen with any drawing that you can create in MacPaint. One disadvantage of this technique is that the newly created start-up screen can take up as much as 20K or so of valuable disk space.

I have discovered an alternative that takes up no extra disk space at all! It works if you simply want to substitute a short message for the words *Welcome to Macintosh*. For example, you might want to have the name of each disk appear (e.g., Checkbook Data Disk).

You need a utility program such as Fedit, MacTools, or ExamineFile, that allows you to alter the Hex/ASCII code directly on a disk. I have found Fedit to be the most useful. If you are using Fedit, follow these steps:

1. Select Open File from the File menu.
2. Open the System file of the disk that you wish to alter.
3. Select Display Sectors in ASCII from the Display menu (if it's not already selected).
4. Check Resource Fork on the Options menu.
5. Select Read Sector from the Edit menu. Type in a request for Sector 6.
6. Select ASCII Modify from the Edit menu.
7. In the middle of sector 6 will be the words *Welcome to Macintosh* (see figure 2). Write over these words with your own message. The message cannot exceed the length of the expression *Welcome to Macintosh*. It can be shorter, though. Simply type blank spaces to make up for the remainder.
8. Select Write Sector from the Edit menu.
9. Quit Fedit.

Now the next time you use the modified disk at start-up, the customized message you created will appear, instead of the familiar words *Welcome to Macintosh*.

Ted Landau
Rochester, MI

HIDDEN COMMANDS

A hidden bonus is always fun to uncover, and when it turns out to be useful, the reward is even greater. Microsoft BASIC 2.0 lets you enter a whole series of statements with a single keystroke when you hold the Option key down. Your screen won't indicate that anything unexpected is

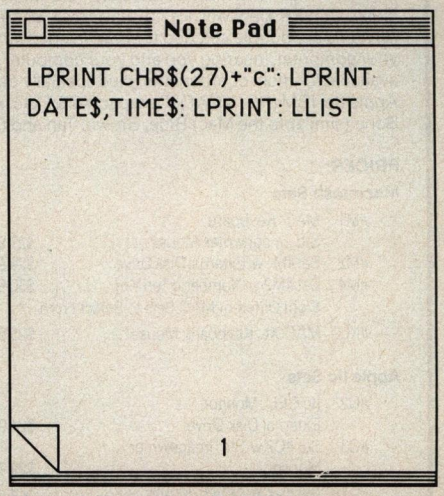

Figure 1: Paste these BASIC statements into the Command window for quick printouts.

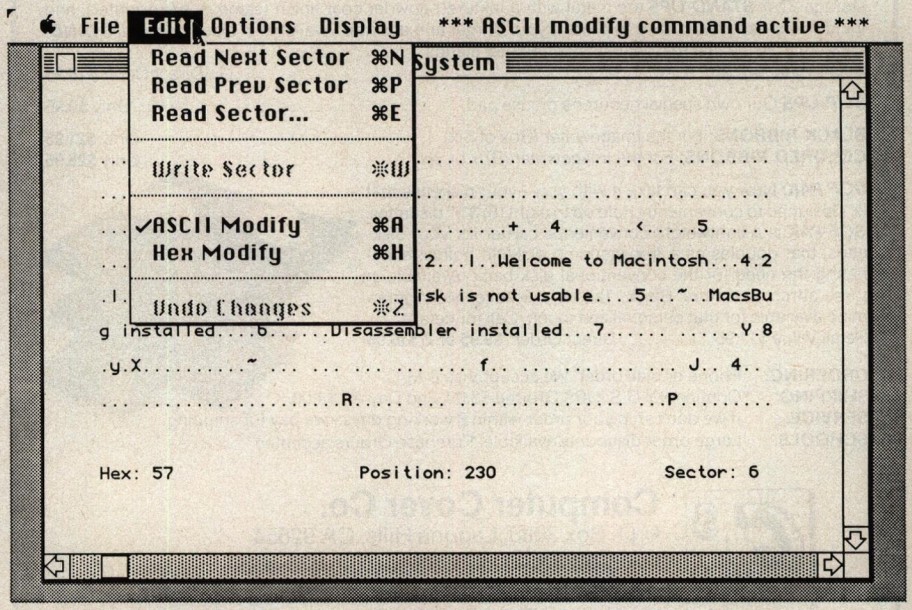

Figure 2: You can replace Welcome to Macintosh with a short message of your own.

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happening as you press the keys, but when you press the Return key, the hidden statements appear. For example, you can type the word DATA, and it will appear as DATA on the screen, or you can hold down the Option key while typing *c*, and *c* appears. When you press the Return key, however, both entries become DATA. (If the second becomes ATN, you probably had the Caps Lock key down.)

Not all keys have a hidden counterpart, and the uppercase/lowercase distinction is important. Figure 3 is a list of 45 Option-key commands. If you usually write BASIC programs with the Caps Lock key depressed, remember that it does not automatically give you uppercase for all keys; it is a shift for letters only.

It's just as easy to type in most of the short statements from the keyboard as it is to remember which key to press in addition to the Option key. Not so with the longer statements, however. It is much easier to type Option-5 than it is to spell out RETURN. WHILE and WEND are easy to enter with this new technique, and the string-manipulation statements such as STRING$ and RIGHT$ are especially suitable.

Clayton Carlile
Palmetto, FL

Hidden Statement	Keyboard Entry	Hidden Statement	Keyboard Entry
AND	Option-L	PUT	Option-=
ASC	Option-A	READ	Option-"
ATN	Option-C	REM	Option-O
CVS	Option-a	RETURN	Option-5
DATA	Option-c	RIGHT$	Option-+
EQU	Option-X	RND	Option-,
IMP	Option-B	RSET	Option-.
LOC	Option-*	SGN	Option-y
LOF	Option-4	SIN	Option-m
LOG	Option-3	SPACE$	Option-d
LSET	Option-6	SQR	Option-w
MID$	Option-8	STATIC	Option-W
MKD$	Option-7	STRING$	Option-p
MKI$	Option-s	STR$	Option-P
MKS$	Option-r	TAN	Option-b
MOD	Option-N	THEN	Option-T
NEXT	Option-g	TO	Option-R
NOT	Option-Y	USING	Option-E
ON	Option-2	VAL	Option-0
OPEN	Option-e	XOR	Option-Z
OR	Option-:	WEND	Option-z
PRINT	Option-u	WHILE	Option-'
		WRITE	Option-o

Figure 3: Forty-five hidden Microsoft BASIC 2.0 commands

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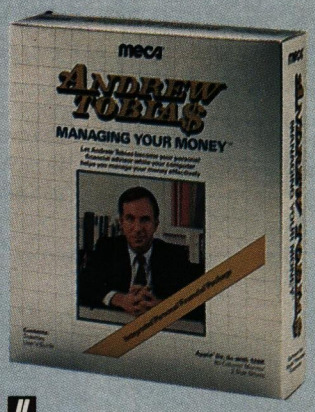


II SERIES

MANAGING YOUR MONEY

The personal financial software Managing Your Money is now available for Apple IIe and IIc computers. The software comprises seven integrated programs that include a budget and checkbook section, a portfolio manager, a tax estimator, an insurance evaluator, an electronic reminder calendar, and a net-worth estimator. Additional features enable users to record, code, and analyze investments; tally realized and unrealized gains and losses; calculate tax-shelter and rental-property internal rates of return; and handle retirement planning. Managing Your Money is available in two versions: a 5¼-inch-disk version and a 3½-inch-disk version that runs on the UniDisk 3.5. *(List Price: $199.95)*

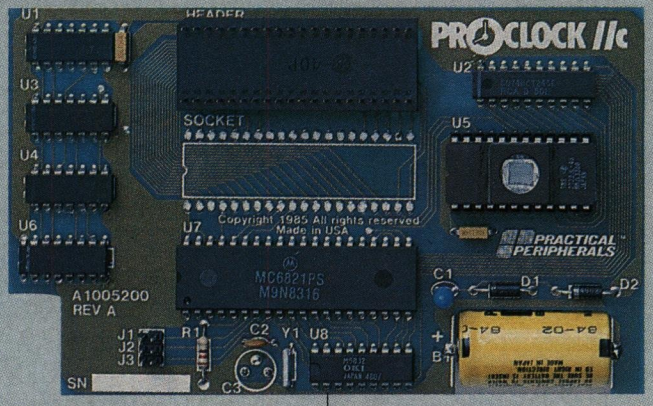
Requires: Apple IIe or IIc
Micro Education Corporation of America (MECA)
285 Riverside Avenue
Westport, CT 06880
(203) 222-1000

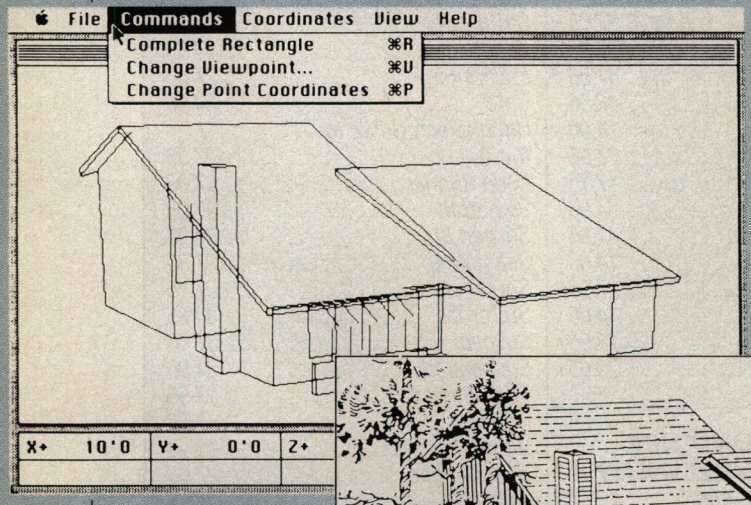
CIRCLE READER SERVICE NO. **501**

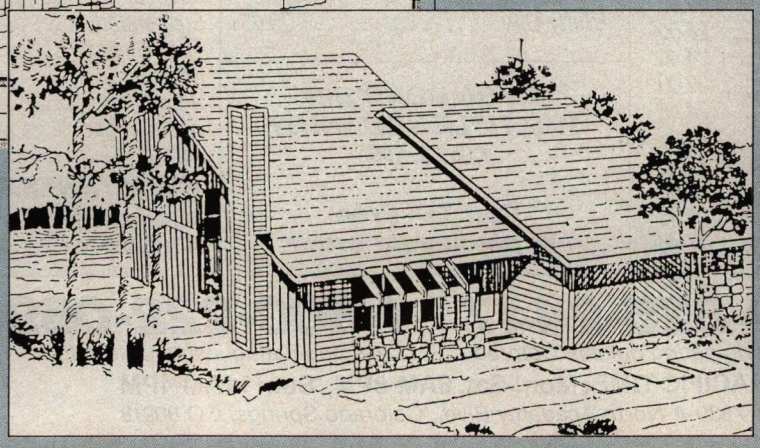
II SERIES

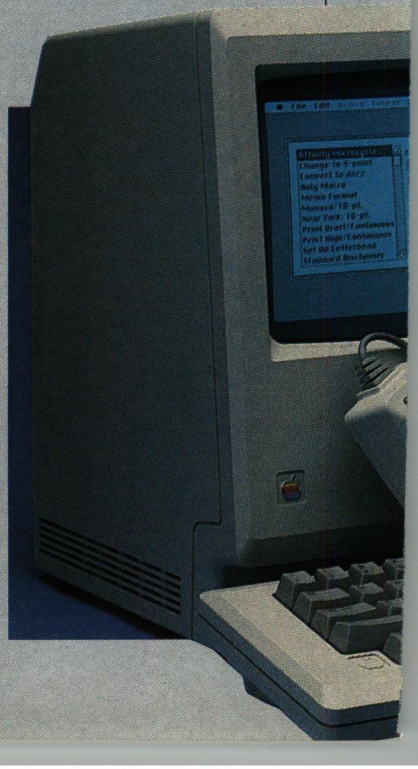
PROCLOCK IIc

A clock/calendar card for IIc computers, PROCLOCK IIc allows users to time- and date-stamp files and generate precise interrupts for foreground or background programming. Users can also dump screen contents to a printer at any time; rotate, emphasize, or invert graphic images or make them double size; and activate the IIc monitor program to make program changes or recover from nonresponsive conditions. Designed to be fully com-

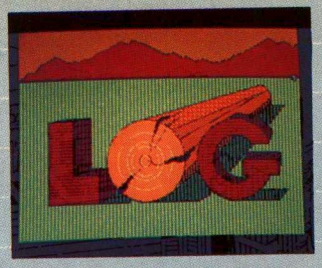








Andrew Tobias Managing Your Money (top) for the IIe and the IIc.
MacPerspective (left and below) lets users construct perspective drawings on the Macintosh.
The PROCLOCK IIc (above) is a clock/calendar card for the Apple IIc.



patible with ProDOS, the card also works with DOS 3.3 and Apple Pascal. The PROCLOCK IIc Utilities Diskette provides routines for using the card in Pascal, demonstration programs, utilities, and a job-time-logging program. *(List Price: $159)*
Requires: Apple IIc
Practical Peripherals, Inc.
31245 La Baya Drive
Westlake Village, CA 91362
(800) 641-0814
in CA (818) 991-8200
CIRCLE READER SERVICE NO. **502**

MAC

TEMPO

Affinity Microsystems has introduced Tempo, a powerful macro-producing tool that can operate within and between Macintosh programs. Its features include an editing facility, pauses for text entry or time interval, user-created dialog boxes, and the abilities to branch on a logical select and to transfer information between unrelated programs. Users can record any series of Macintosh commands and replay them rapidly by entering a single keyboard command. *(List Price: $99)*
Requires: Macintosh
Affinity Microsystems Ltd.
1050 Walnut Street
Suite 425
Boulder, CO 80302
(303) 442-4840
CIRCLE READER SERVICE NO. **503**

II SERIES

COMPU-TEACH EDUCATIONAL SOFTWARE

The educational-software developer Compu-Teach has introduced a line of interactive programs for 4- to 10-year-olds that teaches basic educational skills—reading, arithmetic, and spelling. Based on learning theories developed at Yale University, the programs use state-of-the-art graphics, animation, and sound effects to provide education reinforced by entertainment.

Programs available for Apple computers include A B sCenes 1 and Word Pieces 1, which teach children ages 3 to 6 basic reading skills. A B sCenes provides three games that teach the alphabet, and Word Pieces 1 introduces simple, three-letter words and phonetics.

Arithmetic programs in Compu-Teach's Arithmetic Series include Counting, for ages 3 to 6; Addition for ages 4 to 7; and Subtraction, for ages 5 to 8. Addition and Subtraction include several parameter settings that allow the programs to provide different levels of difficulty; all programs demonstrate correct procedures when children make errors.

For children ages 7 to 12, two programs in the Ruby the Scene Machine series—Main Street and The Farm—help build vocabulary. Ruby, the drawing robot, draws a variety of objects that children can place anywhere in the frame. Children make choices from a menu of available objects so that vocabulary, spelling, and reading skills are all involved. The programs also teach perspective and spatial relationships. *(List Price: A B sCenes, Word Pieces; Arithmetic Series, $39.95 each; Ruby the Scene Machine, $49.95)*
Requires: Apple II, II Plus, or IIe; 48K RAM
Compu-Teach, Inc.
240 Bradley Street
New Haven, CT 06511
(800) 44T-EACH
in CT (203) 777-7738
CIRCLE READER SERVICE NO. **504**

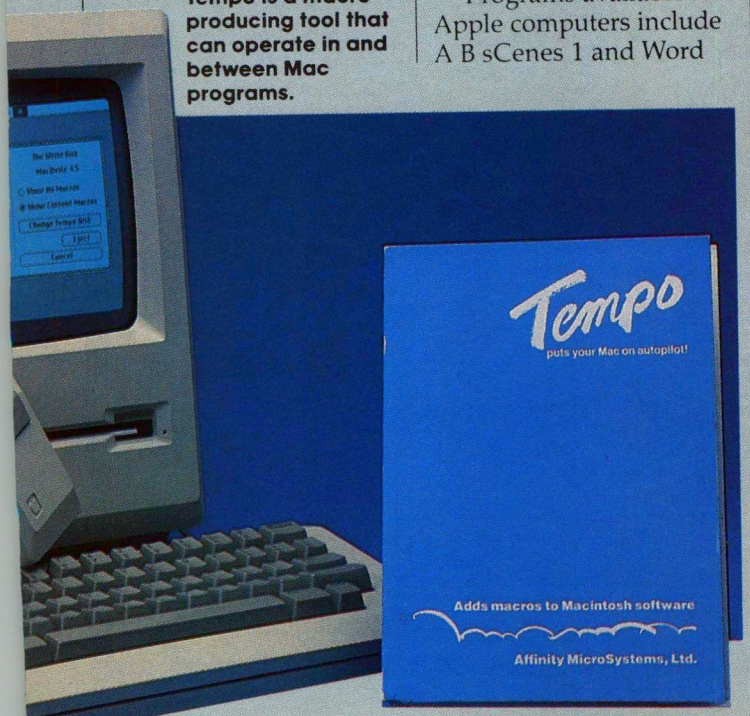
Educational Software from Compu-Teach, Inc.

MAC

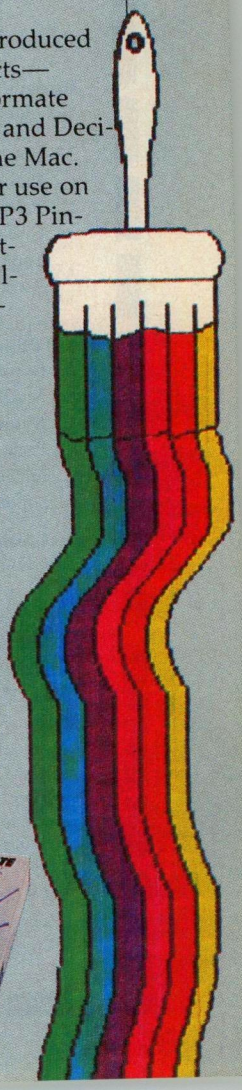
SOFTSTYLE MACINTOSH SOFTWARE

SoftStyle has introduced four new products—Colormate, Colormate Art 1, Toshstart, and DecisionMap—for the Mac.

Developed for use on NEC CP2 and CP3 Pinwriter color printers, Colormate allows users to enhance business



Tempo is a macro-producing tool that can operate in and between Mac programs.



Colormate, from SoftStyle, Inc. lets users color and print text and graphics created on the Mac.

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___ LA DisplayWrite 3
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___ GZ Perfect Writer
___ LC Personal Typewriter
___ HA pfs:Write
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___ HG Volkswriter Deluxe
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presentations and illustrations. Users can color and print text or pictures created with other Macintosh software in eight colors. The program provides several tools similar to those in MacPaint, along with new tools—ColorBits, Magnifying Glass, and eight Display Selection Blocks that emulate color filters on a camera. Colormate users can open full-size MacPaint documents, color them, and print full color in a single pass, as well as color black-and-white images from other application documents.

Colormate Art 1 provides precolored clip art for use with Colormate and NEC Pinwriter printers. The software includes 160 images for creating business, professional, and educational presentations (see figure below). Users can cut and paste the images into Colormate documents and can also incorporate black-and-white forms of the images into existing graphics and text that they have created using other application software.

Toshstart is a package that interfaces Toshiba America's 3-in-One series of printers to the Mac. The package fully supports letter-quality, high-speed draft, and graphics printing on Toshiba's 24-pin, serial dot-matrix P1340, P1351, and P351 printers. It is compatible with all application software that uses Macintosh printing standards.

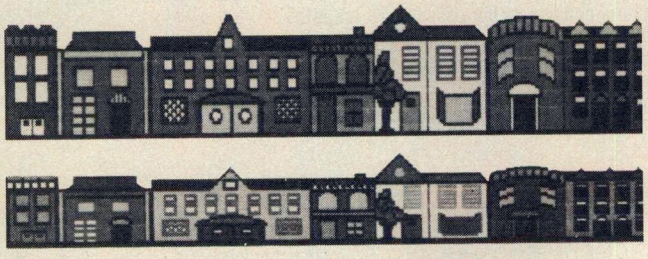
The fourth product, DecisionMap, features easy-to-use decision modeling, techniques, automatic generation of graphics presentations, and the ability to use templates. The program lets users experiment with different weightings of decision factors and rankings of alternative decisions. Users can enter up to five factors at any given level but can then break them down into subfactors. After weighting the factors and entering decision choices, users can display and print bar graphs or text reports. Other report options include outlines of decision trees and analysis reports.

Optional templates that provide prepackaged checklists for frequently made business and personal decisions are also available. *(List Price: Colormate, $125; Colormate Art 1, $45; Toshstart, $45 each; DecisionMap, $145)*

Requires: Macintosh, NEC CP2 or CP3 Pinwriter (Colormate software) or Toshiba 3-in-One series printer (Toshstart)

SoftStyle, Inc.
7192 Kalanianaole Highway
Suite 205
Honolulu, HI 96825
(808) 396-6368

CIRCLE READER SERVICE NO. **505**



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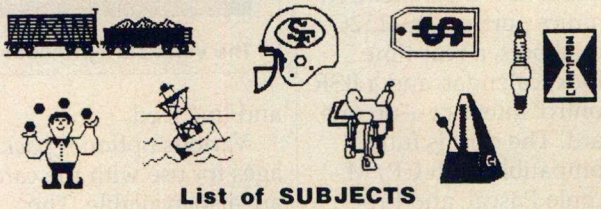

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F	DOUBLE STRIKE	L	BIDIRECTIONAL

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N	DOUBLEWIDE EMPHASIZED
O	DOUBLEWIDE EMPHASIZED DOUBLESTRIKE
P	CONDENSED DOUBLEWIDE
Q	CONDENSED DOUBLEWIDE DOUBLESTRIKE
R	CONDENSED DOUBLESTRIKE
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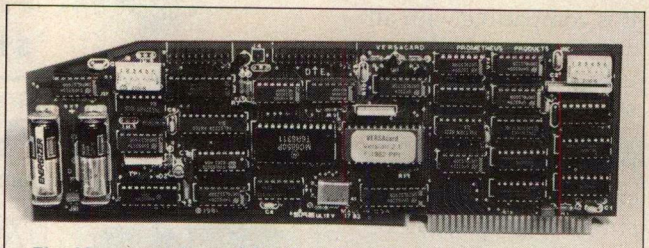
HARDWARE

II SERIES

VERSACARD

Versacard provides four functions—a parallel Centronics port, an RS-232C serial port, a real-time clock/calendar, and a BSR control interface—on one card. The card is fully compatible with CP/M, Apple Pascal, and ProDOS. Installation is simple: Place the card in the slot of your choice, and the serial port shows up in this slot. Then select the other peripherals for any empty slots by setting a switch. Other features include paging modes; a dumb-terminal mode; and the abilities to set line length and line feed.



The Versacard provides four functions on one card

Various optional packages for use with the card are also available. The Home Controller Package lets your computer control almost any electrical device in your home. Graphitti Upgrade ROM upgrades Versacard, enabling it to print high-res graphic screens with a few simple keyboard commands. Finally, the Applications and Diagnostic Disk contains several programs that you can use to check the card's functions. *(List Price: Versacard, $199; Home Controller Package, $65; Graphitti Upgrade ROM, $40; Applications and Diagnostic Disk, $25)*

Requires: Apple II, II Plus, or IIe

Prometheus Products, Inc.
4545 Cushing Parkway
Fremont, CA 94538
(415) 490-2370

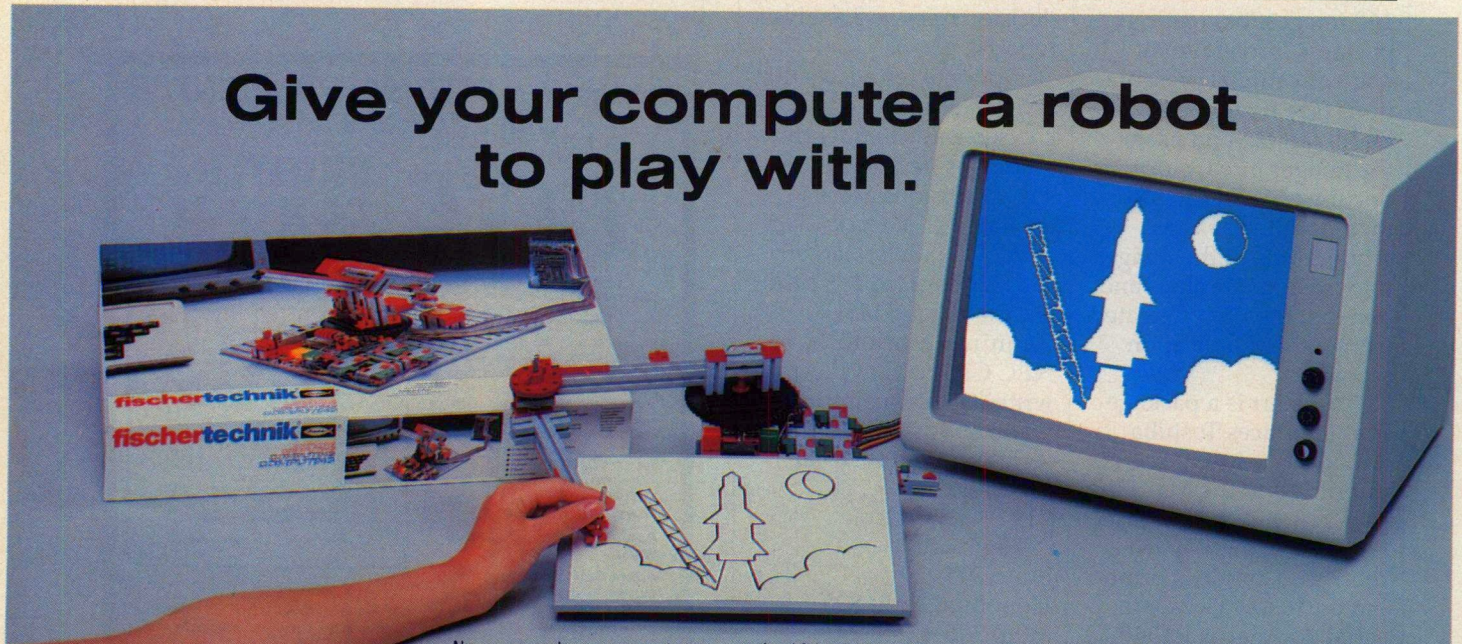
CIRCLE READER SERVICE NO. **506**

HARD/SOFTWARE

MAC

APPLETALK NETWORK SERVER FOR THE MAC

Designed to serve the Macintosh Office, the half-height, 20-megabyte AppleTalk Network Server can back up data at a rate of 1 megabyte per minute onto rugged 10-megabyte cartridges. The server can accommodate up to 20 Macintosh computers at one time. In addition, the dual-drive system allows users to partition disks into one or more password-protected segments. The package includes two 10-megabyte cartridges; AppleTalk sup-



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For more information on the fischertechnik Robotic Computing Kit, contact your nearest fischertechnik dealer or call 201-227-9283. fischer America, Inc., 175 Route 46 West, Fairfield, NJ 07006.

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port software; and IOMEGA utilities, such as whole-disk copying, partitioning, password protection, and formatting. *(List Price: $3750)*
Requires: Macintosh
IOMEGA Corporation
1821 West 4000 South
Roy, UT 84067
(801) 778-1000
CIRCLE READER SERVICE NO. **507**

SERIES

SOTABUG

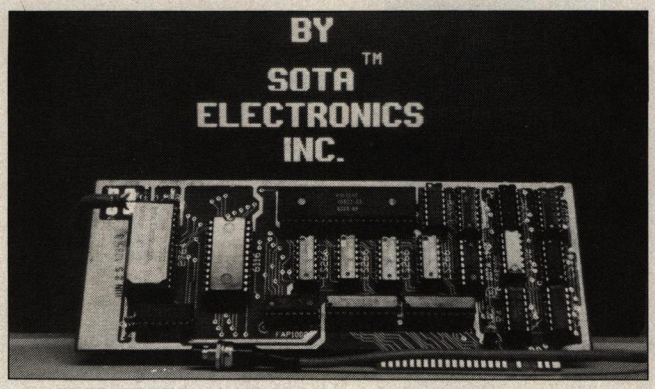
Designed to provide assembly-language programmers with the debugging tools found on professional development systems, Sotabug is a card that contains an extensive program in ROM and several hardware features to aid programmers. The product enables users to trace programs one step at a time and observe the contents of registers, stop the program at user-defined breakpoints, and stop the program when a user-specified address is referenced. Sotabug also features a built-in miniassembler, full support for both the 6502 and the 65C02, and a user-definable test after each instruction. In addition, users can count the number of clock cycles required to execute sections of code, can access the NMI line to regain control of programs that are running in loops, and can use a printer or external display terminal for program debugging while viewing graphics on the Apple computer screen. *(List Price: $179.95)*
Requires: Apple II, II Plus, or IIe
Sota Electronics, Inc.
1817 Madison Avenue
Toledo, OH 43624
(419) 255-7224
CIRCLE READER SERVICE NO. **508**

SOFTWARE

SERIES

MOUSE BUDGET

A low-price, personal financial-management program, Mouse Budget combines flexible budgeting and accounting functions with a mouse-based user interface. Features of the program include income and expense summaries; user-defined accounts; net-worth statements; a list of tax-related items; and checkbook reconciliation. Because it makes use of the mouse and clear pull-down menus, the program is easy to learn and simple to use. *(List Price: $69.95)*



Sota Electronic's Sotabug, for debugging Apple II-series programs

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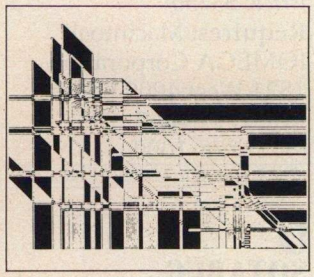
CIRCLE 148 ON READER SERVICE CARD

Requires: Apple IIe or IIc, 128K RAM, mouse
International Solutions
910 West Maude Avenue
Sunnyvale, CA 94086
(408) 773-0443
CIRCLE READER SERVICE NO. **525**

MAC

MAGIC SLATE

Designed as a tool to teach creativity, Magic Slate generates both formal, geometric, and abstract art and stylized graphics. The program provides rapid visual feedback and allows users to explore graphic ideas without expending large amounts of time or materials. It does not depend on users' drawing abilities but instead puts the emphasis on maintaining a creative mood and spontaneity.



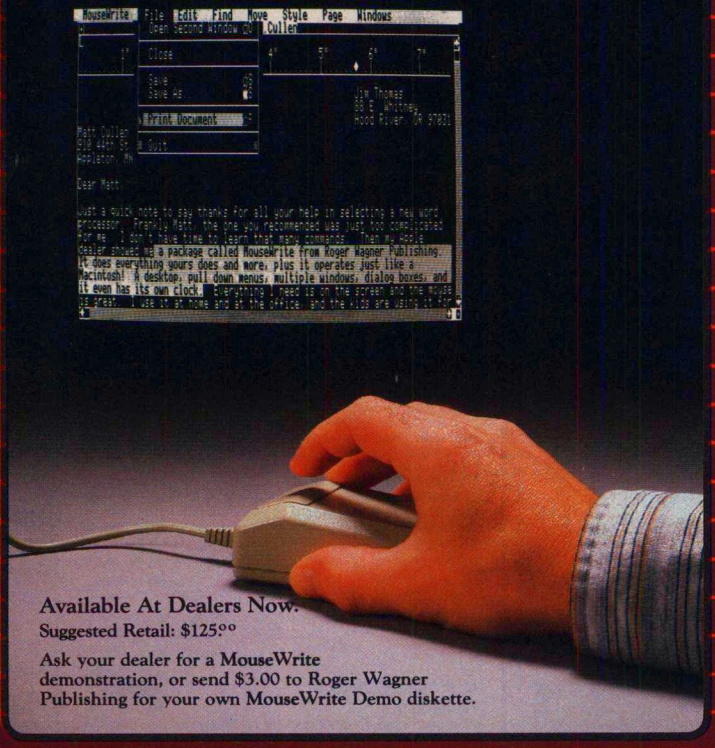
(List Price: $99)
Requires: Macintosh
Devionics
P.O. Box 2126
Covina, CA 91722
(714) 779-7193
CIRCLE READER SERVICE NO. **531**

MAC

LASERBASE

Kette Group has announced an agreement with Laser Software International of England to publish Laser Software products for the Macintosh. The first release in the series is LaserBase, a database-management system that features MacPaint-like field and record design. The LaserBase program can access files up to 16 megabytes long, supports multilevel password schemes, and has unlimited sorting ability. Other features of LaserBase include a report-generation feature that allows users to print reports in an unlimited variety of formats and a mail-merge ability. *(List Price: $150)*
Requires: Macintosh or Macintosh XL with MacWorks, 512K RAM
Kette Group, Inc.
13895 Industrial Park Blvd.
Minneapolis, MN 55441
(800) 328-0184
in MN (612) 559-5728
CIRCLE READER SERVICE NO. **527**

MouseWrite™
The Mouse-Based Word Processor
For the Apple IIe and IIc



Available At Dealers Now.
Suggested Retail: $125.00
Ask your dealer for a MouseWrite demonstration, or send $3.00 to Roger Wagner Publishing for your own MouseWrite Demo diskette.

Roger Wagner™
PUBLISHING, INC.
10761 Woodside Avenue • Suite E • P.O. Box 582 • Santee, CA 92071 • 619/562-3670

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MAC

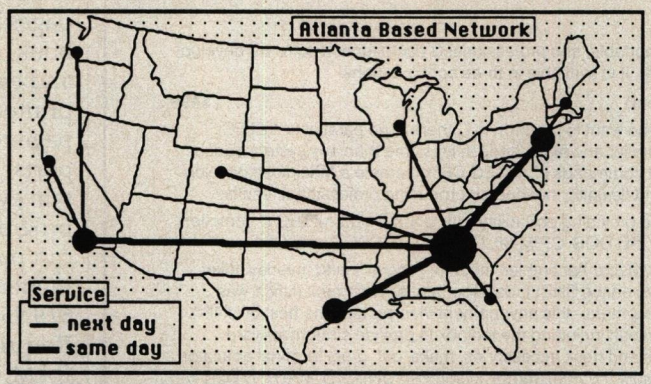
MACATLAS

MacAtlas, a clip-art package for making maps on the Macintosh, provides outline maps for use with MacPaint. The map outlines are designed to help users produce maps for publication, research, analysis, communication, and personal use. Volume I includes several map files of the USA in three sizes: 8 × 10 inches, 5 × 7 inches, and MacPaint window size. Each size includes images broken down by state, region, and census divisions. Volume 2 includes maps of the world and continents on similar scales. Users can add symbols, shading, and text and then print their results using the ImageWriter or LaserWriter printers.

Requires: Macintosh

Micro:Maps
P.O. Box 1353R
Morristown, NJ 07960
(201) 658-4333

CIRCLE READER SERVICE NO. **512**



MacAtlas provides clip-art outline maps for use with MacPaint.

MAC

ACTIVISION GAMES

Activision has released versions of two of its most popular titles—Hacker and Mindshadow—for Macintosh computers. Both programs make full use of the computer's high-resolution graphics and pull-down menus.

Hacker is a modern-day adventure based on an accidental break-in to a private computer system. As in real life, the game has no rules and no clues.

In Mindshadow, players take on the personality of an amnesiac who has just awakened. The amnesiac finds himself on a desert island and must find out who put him there and, more important, who he is. *(List Price: $44.95 each)*

Requires: Macintosh

Activision, Inc.
2350 Bayshore Frontage Road
Mountain View, CA 94043
(415) 960-0410

CIRCLE READER SERVICE NO. **513**

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- The entire system is on one standard size plug in card that fits neatly inside the Apple.
- System includes sample programs on disk.

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A few applications may include the monitoring of ● flow ● temperature ● humidity ● wind speed ● wind direction ● light intensity ● pressure ● RPM ● soil moisture and many more.

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- Single PC card
- 8 channels A/D
- 8 channels D/A
- Superfast conversion time
- Very easy programming
- Many analog ranges
- Manual contains sample applications

A/D SPECIFICATIONS

- 0.3% accuracy
- On-board memory
- Fast conversion (.078 MS per channel)
- A/D process totally transparent to Apple (looks like memory)
- User programmable input ranges are 0 to 10 volts, 0 to 5, −5 to +5, −2.5 to +2.5, −5 to 0, −10 to 0.

The A/D process takes place on a continuous, channel sequencing basis. Data is automatically transferred to its proper location in the on-board RAM. No A/D converter could be easier to use.

D/A SPECIFICATIONS

- 0.3% accuracy
- On-board memory
- On-board output buffer amps can drive 5 MA
- D/A process is totally transparent to the Apple (just poke the data)
- Fast conversion (.003 MS per channel)
- User programmable output ranges are 0 to 5 volts and 0 to 10 volts

The D/A section contains 8 digital to analog converters, with output buffer amplifiers and all interface logic on a single card. On-card latches are provided for each of the eight D/A converters. No D/A converter could be easier to use. The on-board amplifiers are laser-trimmed during manufacture, thereby eliminating any requirement for off-set nulling.

PRICE $199

SIGNAL CONDITIONER

Our 8 channel signal conditioner is designed for use with both our A/D converters. This board incorporates 8 F.E.T. op-amps, which allow almost any gain or offset. For example, an input signal that varies from 2.00 to 2.15 volts or a signal that varies from 0 to 50 mV can easily be converted to 0-10V output for the A/D.

The signal conditioner's outputs are on a high quality 16 pin gold I.C. socket that matches the one on the A/D's so a simple ribbon cable connects the two. The signal conditioner can be powered by your Apple or from an external supply.

FEATURES

- 4.5" square for standard card cage and 4 mounting holes for standard mounting. The signal conditioner does not plug into the Apple, it can be located up to ½ mile away from the A/D.
- 22 pin .156 spacing edge card input connector (extra connectors are easily available i.e. Radio Shack).
- Large bread board area.
- Full detailed schematic included.

PRICE $79

I/O 32

- Provides 4, 8-Bit programmable I/O Ports
- Any of the 4 ports can be programmed as an input or an output port
- All I/O lines are TTL (0-5 volt) compatible
- Your inputs can be anything from high speed logic to simple switches
- Programming is made very easy by powerful on-board firmware
- The I/O 32 is your best choice for any control application

The I/O manual includes many programs for inputs and outputs.

Some applications include:
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FOR THE MACINTOSH

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For serious Macintosh developers who want to program in C there is no parallel to AZTEC C68k-c. AZTEC C68k-c produces smaller and faster code in less time than any system benchmarked. The supporting utilities and commands of AZTEC C68k-c create a Macintosh development environment with the power and flexibility needed for producing professional results.

All C features are faithfully supported providing portability with UNIX C and AZTEC C compilers available for the APPLE II, MS DOS, PC DOS, CP/M-86, CP/M-80, TRSDOS, and C64.

Features include: C compiler, 68000 Macro Assembler, modular programming, overlay linker, debuggers, mouse based editor, Z(Vi) editor, SHELL development environment (UNIX was developed to support software development - this environment incorporates the best of UNIX), comprehensive support of the Macintosh including the toolbox to provide straight forward development of Macintosh programs and desk accessories, make, diff, grep, terminal emulator (source), grow (source), desk accessory (source), ramdisk (source), UNIX I/O, MATH, UTILITY, and MACINTOSH run time libraries (source), full support for 512k Mac and Lisa Macworks, 600+ page manual, resource maker, calling C routines from PASCAL, PASCAL from C, and assembler subroutines, no-royalty license.

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AZTEC C68k-p (Personal System) **$199**

For students and professionals doing serious non-commercial work. Includes C compiler, Linker, run time libraries, sample programs (source), debugger, and editor. Restricted license.

C-TREE Database (Aztec object format) **$149**

C-TREE Database (Object + Source) **$390**

FOR THE APPLE II

AZTEC C65/DEV (Developer's System) **$299**

This C compiler and software development system comes with C compiler, 6502 assembler, SHELL, overlay linker, UNIX I/O, Screen, and Graphics libraries, editor, utilities, and support for ProDos.

AZTEC C65 ..... **$199**

C compiler, 6502 assembler, Linker, libraries, Apple DOS 3.3 support.

AZTEC C65 Personal ..... **$ 99**

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201-530-7997 (NJ)

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CIRCLE 189 ON READER SERVICE CARD

GRADEAID

Designed for use by instructors, GradeAid is a menu-driven program that enables users to enter, store, change, print, and total their students' grades. The program can handle 4000 grades—100 grades for each of 40 students, for example—and has two secret passwords. Grades appear on pages like those of a traditional gradebook, and users can weight each page and each assignment. Three different printouts are available—traditional page reports, end-of-semester reports, and student reports that contain every grade for each student. The program also has an alphabetizer and can produce averages of all assignments and all pages. *(List Price: $19.95)*

Requires: Apple II, II Plus, or IIe; 48K RAM; DOS 3.3
Prince Publications
P.O. Box 4547
Berkeley, CA 94704-0547
Written inquiries only

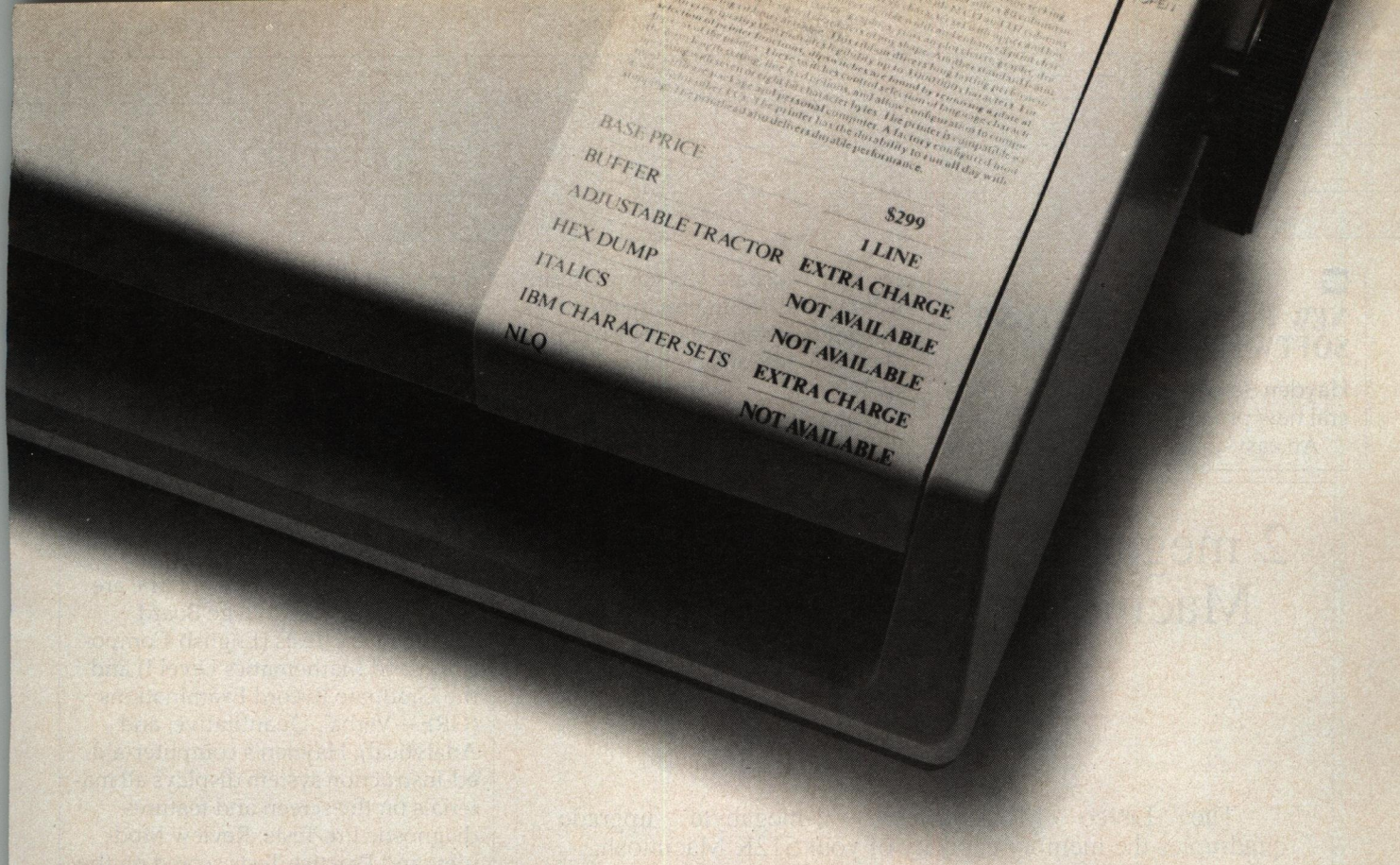
CIRCLE READER SERVICE NO. **570**

AUTOMAC

A utility program for the Macintosh that increases the speed and power of existing software, AutoMac is a general-purpose "command recorder." The program enables users to record a series of mouse movements and/or keystrokes and play it back using a single command. Users can create their own keyboard commands to operate window controls, work menus, type standard paragraphs of text, and so on—all without using the mouse. AutoMac remains in memory between programs, so commands can cross from one program to the next, and users can store commands in special keyboard files so that they are available automatically. *(List Price: $33.95)*

Requires: Macintosh, 512K RAM
Genesis Micro Software
106 147th Avenue SE
Suite 2
Bellevue, WA 98007
(206) 747-8512

CIRCLE READER SERVICE NO. **571**



If the sticker on your printer reads like this, you've been stuck.

Too many big-winded printer companies are sticking it to too many unsuspecting consumers. Making a lot of noise about features that aren't featured at all.

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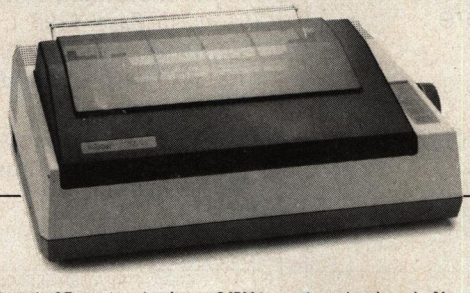
So, if you'd rather be struck by a sticker that makes great sense than stuck with a sticker that makes nonsense, look into the SG-10 today. At your local Star dealer.



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CIRCLE 211 ON READER SERVICE CARD

MAC

NEW HAYDEN MACINTOSH SOFTWARE PROGRAMS

Hayden Software has announced several new programs for the Macintosh.

An easy-to-use relational-database program, MacBase lets you perform such tasks as setting up mailing lists, managing inventories, performing sales analyses, or sending out invoices.

Using the program's icons and pull-down menus, you can design forms with data types such as alphanumeric, integer, floating point, telephone date, and calculations. Because data items can "relate" to other forms, you can see multiple views of forms and cross-update files. The program also lets you use MacPaint images of business forms as a background for form design and use forms you design to print reports or create other forms.

Two additions to the company's Score Improvement System line are programs for the College Board Achievement Tests (English Composition and Mathematics Level I) and the Graduate Record Examinations (GRE—Verbal, Quantitative, and Analytical). Hayden's computer-aided-instruction system displays all materials on the screen and features diagnostic Pre-Tests, Review Modules, and Practice Tests scored on the "800" scale.

Finally, Hayden Software has released two word-game products: Perplexx, a Scrabble-like game, and Word Challenge II, an adaptation of Parker Brothers' Boggle. In Perplexx you must arrange randomly assigned letters on a grid to form interconnecting words. You compete against Lexx, the computer Word Wizard, who has a vocabulary of more than 90,000 words, or you can compete against up to three other players, while Lexx acts as an impartial scorekeeper and referee. The program offers four levels of difficulty.

Lexx is again your opponent in Word Challenge II, and you can set his performance level to 1of 26 settings. You can also choose from three grid sizes, rotate the board during play, select from several different ways to score, and enter letters in the matrix yourself.

Again, the program has a dictionary of more than 90,000 words. *(List Price: MacBase, $195; College Board Achievement Tests, $99.95; GRE, $129.95; Perplexx, Word Challenge II, $39.95 each)*

Requires: Macintosh

Hayden Software Company, Inc.
600 Suffolk Street
Lowell, MA 01854
(617) 937-0200

CIRCLE READER SERVICE NO. **572**

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Levco
6160 Lusk Boulevard, Suite C-203
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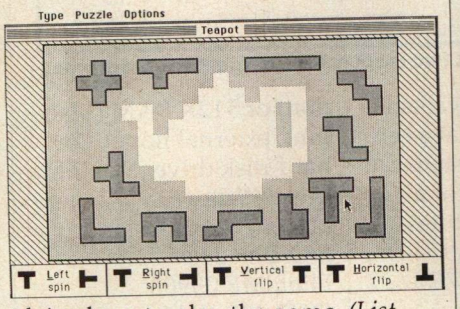
(619) 457-2011

CIRCLE 212 ON READER SERVICE CARD

MAC

MACPOLY

MacPoly is a new game for the Macintosh that comprises 100 jigsaw puzzles, ranging from easy to impossible. The jigsaw pieces are polyominoes—shapes made of squares—that players must drag, spin, and flip into place. Although some puzzles are old, most are new, and solutions are provided for all but the impossible ones. The game comes with a manual that ex-



plains how to play the game. *(List Price: $29.95)*

Requires: Macintosh
Sabaki Corporation
Department 1200
P.O. Box 8217
Rego Park, NY 11374
(718) 897-9638

CIRCLE READER SERVICE NO. **574**

SERIES

BATTALION COMMANDER

Designed for beginner or intermediate players, Battalion Commander is a real-time-action strategy war game in which the player is in command of a modern fighting force the size of an army battalion. The basic level of unit is the platoon, and orders are given to company and platoon commanders. The game includes five scenarios: Novice, Pursuit and Exploitation, Meeting Engagement, Attack, and Defense. For all scenarios except Novice, players can adjust the nationality of the opposing forces, their relative strength, and the type of terrain. *(List Price: $39.95)*

Requires: Apple II, II Plus, IIe, or IIc
Strategic Simulations, Inc.
883 Stierlin Road
Building A-200
Mountain View, CA 94043-1983
(415) 964-1353

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1.5Mb

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MaxPrint: print spooler software that lets you work and print at the same time.

TheMax is available now for both the 128K and the 512K Macintosh. Kits and 512K upgrades are also available. Ask your dealer for more information, or contact

MacMemory Inc.

473 MACARA AVE., SUITE 701, SUNNYVALE, CA 94086, (408) 773-9922.

Macintosh is a trademark licensed to Apple Computer Inc.

CIRCLE 200 ON READER SERVICE CARD

MAC

HAYES ASSOCIATES' SOFTWARE

Hayes Associates has released two programs for the Macintosh—MacReservation, a resource-management program, and MacInn, a front-desk/reservation program for hotels.

MacReservation is intended to help businesses schedule the use of resources. Users can design a "floorplan" showing a business and its schedulable resources and can make, change, or cancel reservations for each resource. The floorplan can contain up to 1000 resources, with more than 300 visible at one time, and the program can handle 65,000 resources. Using a special clock, users can specify times for the use of resources and can scan forward or backward in time to check available resources and reservations. The program also includes billing functions.

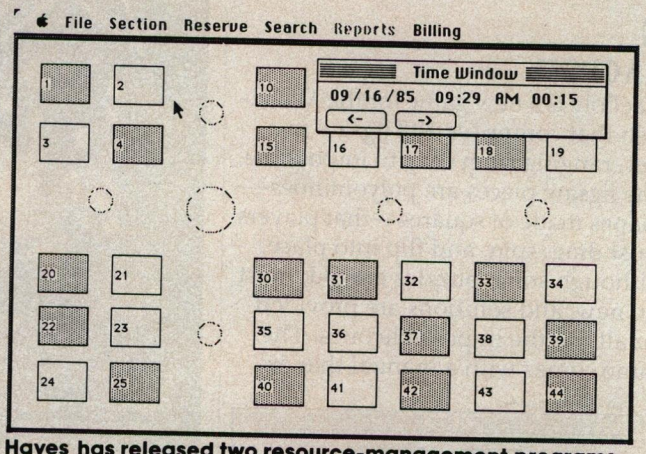
Designed for any size of lodging hospitality business, MacInn enables users to take reservations, check guests in and out, and post charges. Users can define several categories of charges, each with different taxes. MacInn allows searching by name, and it includes reports designed to help track and analyze use of a facility and its individual resources. Network communications are available as an option, so that a central reservation system can take reservations for a group of local facilities.

(List Price: MacReservation, $129.95; MacInn, $750)

Requires: Macintosh, 128K RAM (MacReservation) or 512K RAM (MacInn), external floppy- or hard-disk drive (MacInn), ImageWriter

Hayes Associates, Inc.
P.O. Box 216
Eliot, ME 03903
(207) 439-9361

CIRCLE READER SERVICE NO. **516**



Hayes has released two resource-management programs.

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$79.95 Ask for EDD at your local computer store, or, *to order direct;* send **$79.95** plus $2 shipping ($5 foreign). Mastercard/Visa accepted. *Prepayment required.*

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- **FREE APPLEWORKS TIME & DATE ON-SCREEN SOFTWARE** that can auto-date and auto-time stamp database files with any ProDOS clock.
- **FREE ULTRA-FAST RAM DISK SOFTWARE** that isn't like Ramworks™ $29 Ram disk software. It can be run alone or WITH APPLEWORKS. FREE RAM TEST & optional CP/M & Pascal Ram disk too!
- **FREE APPLEWORKS EXPANDER SOFTWARE** that modifies AppleWorks once so all features are automatic, loads ALL or PARTS of AppleWorks into memory, runs 20 x faster, increases the Desktop over 1125k, auto-segments large files onto multiple disks, stores over 5325 records! An increased Clipboard/Word Processor update, 16-Bit integrated software AND more piggyback memory is due soon.
- **15 DAY MONEY BACK GUARANTEE, FREE SOFTWARE UPDATES, FREE 64k MEMORY WITH EACH 256k/512k CARD** ONLY FROM COIT VALLEY COMPUTERS. 5 YEAR WARRANTY THAT, UNLIKE RAMWORKS, INSURES COVERAGE NO MATTER WHERE YOU BOUGHT IT! CALL FOR CURRENT PRICES, QUANTITY DISCOUNTS **OR NEW FEATURES!**

	LOWER OUR ~~LOW~~ PRICE
64k **MULTIRAM** IIe	**155.**
128k **MULTIRAM** IIe	**173.**
320k MULTIRAM IIe	**187.**
576k MULTIRAM IIe	**237.**
768k MULTIRAM IIe	**287.**
1024k **MULTIRAM** IIe/FREE RGB	**388.**
1280k **MULTIRAM** IIe/FREE RGB	**499.**
1536k **MULTIRAM** IIe/FREE RGB	**548.**
1792k **MULTIRAM** IIe/FREE RGB	**598.**
64k Memory Expander Chips (8)	**20.**
256k Memory Expander Chips (8)	**60.**
Pico™ Slimline Drive IIc, IIe, II+	**165.**
Apple IIe Enhancement Kit	**62.**
65C816 Co-Processor Card	**162.**
CP/M or Pascal Ram Disk (each)	**17.**
Switch-A-Slot	**165.**

CALL FOR OTHER APPLE PERIPHERAL PRICES.

640k 16-Bit IIc!

Checkmate Technology's **State-Of-The-Art IIc** cards easily expand your IIc up to 640k, are 100% compatable with all IIc software/hardware, & come with the same **FREE SOFTWARE** as MULTIRAM IIe. **MULTIRAM C** is non-upgradable and **MULTIRAM CX** can be upgraded with a **16-Bit 65C816 Co-Processor kit! CALL FOR CURRENT PRICING & QUANTITY DISCOUNTS!**

- **NO JUMPER WIRES, CLIPS, OR DRIVE REMOVAL REQUIRED FOR INSTALLATION. ALL CHIPS ARE SOCKETED AND REMOVABLE** - unlike the competition.
- **USES ABOUT 50% LESS POWER** than the competition-causing less power supply strain or battery pack drain!
- **15 DAY MONEY BACK SATISFACTION GUARANTEE** from Coit Valley Computers. 5 YEAR WARRANTY THAT, UNLIKE THE COMPETITION, INSURES COVERAGE NO MATTER WHERE YOU BOUGHT IT!
- **LOWER PRICES** - We sell IIc cards for much less, and our software updates are free, while competitors usually charge at least $10.

	LOWER OUR ~~LOW~~ PRICE
256k MULTIRAM C	**229.**
512k MULTIRAM C	**279.**
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256k MULTIRAM CX	**278.**
512k MULTIRAM CX	**318.**
16-Bit 65C816 Kit	**135.**

($10 less if bought with card)

Terms: Add $4-Ground or $6-Air shipping & phone # to all U.S. orders (foreign orders extra). Add 3% for P.O.'s (3% 7 net 30) & MasterCard/Visa (include #/expir). For fastest delivery send Cashier's/Certified check, Money Order. C.O.D. (add $5) & personal checks accepted (allow 14 days). Tex res add 6⅛% tax. **CALL FOR LATEST PRICES & QUANTITY DISCOUNTS!**

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ESPRIT PRINTER $149.95

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- FRICTION AND TRACTOR FEED
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COMREX CR-1000
DUAL SLIMLINE DISK DRIVE

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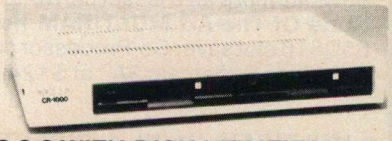
CLOSE-OUT SPECIAL WHILE SUPPLY LASTS!

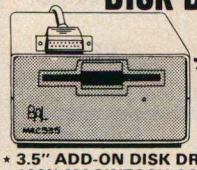
SPACE-SAVING DESIGN
STACK BETWEEN COMPUTER AND MONITOR

- QUIET, RELIABLE HALF HEIGHT DRIVES
- TOTAL STORAGE CAPACITY: 286K BYTES
- AUTO-EJECT MECHANISM
- SHIELDED CABLE INCLUDED



INCLUDES CONTROLLER AND DOS 3.3 WITH DISK UTILITIES

DISK DRIVES



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- 3.5" ADD-ON DISK DRIVE
- 100% MACINTOSH COMPATIBLE
- SINGLE SIDED, 400K BYTES STORAGE
- HIGH RELIABILITY DRIVE HAS AUTO-EJECT
- FULL 1 YEAR WARRANTY

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- ½ HEIGHT-ALPS MECHANISM
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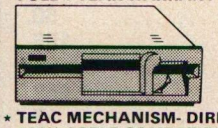
- FULL 1 YEAR WARRANTY



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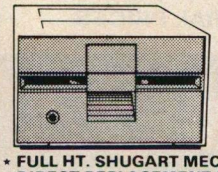
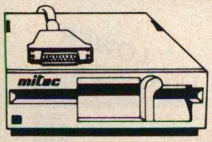
- TEAC MECHANISM- DIRECT DRIVE
- 100% APPLE COMPATIBLE
- FULL 1 YEAR WARRANTY



AP-135 $129.95

- FULL HT. SHUGART MECHANISM
- DIRECT REPLACEMENT FOR APPLE DISK II
- SIX MONTH WARRANTY

NEW FOR APPLE IIc



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- 100% APPLE IIc COMPATIBLE, READY TO PLUG IN W/ SHIELDED CABLE & MOLDED 19 PIN CONNECTOR
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- SIX MONTH WARRANTY

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APPLE IIc ADAPTOR CABLE $19.95
ADAPTS STANDARD APPLE DRIVES FOR USE WITH APPLE IIc

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INCLUDES ASCII PRO-EZ MENU DRIVEN SOFTWARE

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- BELL SYSTEM 103 COMPATIBLE
- AUTO-DIAL/AUTO-ANSWER
- DIRECT CONNECT
- INCLUDES AC ADAPTOR

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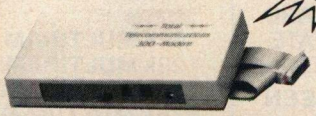

CABLE FOR APPLE IIc $14.95

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MODEL RP525

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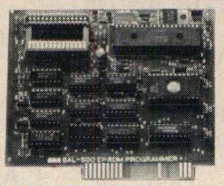

- DUPLICATE OR BURN ANY STANDARD 27xx SERIES EPROM
- EASY TO USE MENU-DRIVEN SOFTWARE INCLUDED
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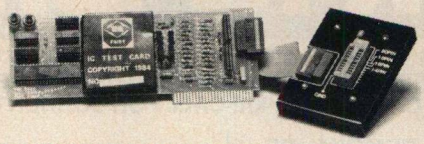
IC TEST CARD



- QUICKLY TESTS MANY COMMON ICs
- DISPLAYS PASS OR FAIL
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- TESTS: 4000 SERIES CMOS, 74HC SERIES CMOS, 7400; 74LS,74L, 74S, SOME PROMS AND RAMS

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16K RAM CARD $39.95

FOR APPLE II+

- 2 YEAR WARRANTY
- EXPAND YOUR 48K APPLE TO 64K
- USE IN PLACE OF APPLE LANGUAGE CARD

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TAXAN RGB VISION III
MODEL 415

- 18 MHz BANDWIDTH
- 640 x 262 PIXEL RES.
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- 12" BLACK MATRIX

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MODEL SC-100

- TOP RATED FOR APPLE
- 13" COMPOSITE VIDEO
- RESOLUTION: 280H x 300V
- INTERNAL AUDIO AMP
- ONE YEAR WARRANTY

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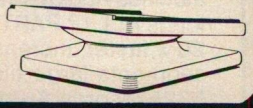
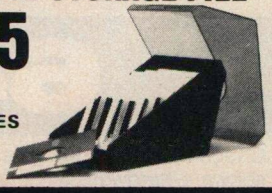
TILTS AND SWIVELS TO PROVIDE OPTIMUM VIEWING ANGLE, REDUCES OPERATOR FATIGUE



DISKETTE STORAGE FILE

$8.95

HOLDS 70 5¼" DISKETTES WITH ROOM TO SPARE



DS/DD NASHUA DISKETTES

$9.90 BOX OF10

89¢ea BULK QTY 50

JOYSTICK

CR401 $7.95

WITH APPLE ADAPTOR CABLE

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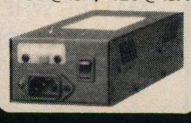
- +5V @ 4A, +12V @ 2.5A
- -5V @ .5A, -12V @ .5A



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MAC

QUICKPROOF

A new thesaurus and spelling corrector, QuickProof provides users with a dictionary of more than 80,000 words and full-length thesaurus with both antonyms and synonyms. When running in its Interactive mode, the program enables users to check spelling in all or parts of a document at any time, without exiting from their word-processing program. In addition, QuickProof has a Glossary feature that lets users enter often-used words, phrases, or formulas into text by using abbreviated forms. *(List Price: $99.95)*

Requires: Macintosh 512K
EnterSet, Inc.
410 Townsend
San Francisco, CA 94107
(415) 543-7644

CIRCLE READER SERVICE NO. **576**

MAC

MACMATE! PRINT SPOOLER

MacMate!, a multifunction productivity tool for the 512K RAM Macintosh, features both a print-spool function, which allows users to work with the computer while printing with the ImageWriter, and a RAMdisk function that emulates a random-access disk drive in memory, thus providing fast temporary storage and access of information. MacMate! is written in machine language and occupies less than 7K of disk space. *(List Price: $49.95)*

Requires: Macintosh, 512K RAM
SMB Development Associates
P.O. Box 3082
Chatsworth, CA 91313
(818) 341-2523

CIRCLE READER SERVICE NO. **577**

II SERIES

LOW RESOLUTION GRAPHICS PLOTTER

The Low Resolution Graphic Plotter is designed to provide teachers with an easy and efficient way in which to print out their students' low-resolution pictures without the need for special software routines or expensive interface cards. The program functions on more than 20 popular black-and-white or color printers and interface cards and enables users to print a full-page graphic in 70 seconds. Once it has been booted, the software is able to print an unlimited number of pictures—the user simply runs the new graphic design and presses the ampersand to call the program. *(List Price: $39.95)*

Requires: Apple II Plus, IIe, or IIc
Burke Software
P.O. Box 515
Park Ridge, IL 60068
(312) 823-1357

CIRCLE READER SERVICE NO. **578**

WITH PROFILER 2.1, WE GUARANTEE YOU A WHOLE LOT LESS.

PFS File

+

PFS Report

$250.00

+

PROFILER 2.1 File/Report

$99.95

PROFILER 2.1 – A SINGLE-DISK DATA MANAGER/REPORT GENERATOR WITH A COMPETITIVE EDGE.

Our competition claims to offer a whole lot more.

We agree. They do.

Like more floppy disks to juggle when shifting from file to report functions—and back again. And then there's a price that's twice as much.

We think we have a better idea. PROFILER 2.1 lets you do everything the competition does—design, organize, file, search, sort, calculate, and print reports. But we do it all on one easy-to-use floppy disk that won't have you flopping back and forth.

Of course, our PRODOS-based program has lots of other advantages, too. It lets you store up to 1,500 records per floppy disk. And you can transfer up to 65,000 records on a hard disk without any additional data entry.

Plus there are all the other little extras, like multiple forms per disk, a full screen editor, multiple index files, AppleWriter II mail merge interface, and the ability to read and write text and AppleWorks files. Merging, transferring, and deleting files is also easy.

So order your PROFILER 2.1 today, and get everything the competition offers, but in a much easier to use program.

And get it all for about half the price.

You couldn't ask for less.

See your dealer or order today
1-800-628-2828 Ext. 530
FILE AND REPORT ONLY $99.95
Plus $3 shipping and 6% CA tax

Software

17610 Beach Blvd., Ste. 29, P.O. Box 1788, Huntington Beach, CA 92647 • 714/963-2221 • 714/841-7400

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CIRCLE 150 ON READER SERVICE CARD

JE520 Voice Synthesizer

for Apple II, II+ and *IIe*

JE520AP. . . . $119.95
JE523TS (Software) $ 9.95

JE614 Numeric Auxiliary Keypad

JE614. . . . . $49.95

12" Monochrome Monitor

for Apple II, II+ *IIe* and *IIc*

AMON. $99.95

Joystick

for Apple *IIe*

AJS-1. . . . . $19.95

Joystick

for Apple II, *IIe* and IBM

UJS-1. . . . . $29.95

Add'l. Apple Compatible Products

Cooling Fan

for Apple II, II+ and *IIe*

APF-1. . . . . $39.95

Switching Power Supply

for Apple II, II+ and *IIe*

KHP4007. . . . $39.95

Parallel Printer Interface

for Apple *IIc*

MW-100. . . . . $69.95
DC9200A 9VDC Xformer $3.25

VERSACARD

for Apple II, II+ and *IIe*

VERSACARD. . . . $169.95
PM-SC (Serial Cable) . . . $24.95
PM-PC (Parallel Cable) . . . $24.95

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APPLE* Compatible Cards FOR APPLE II, II+ AND *IIe**

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Five Key Software Programs!

128K RAM Card** *RAM Disk!*

The **JE868** is functionally compatible with the Apple II language card and can be utilized with all software that can be used with a standard 16K card. The JE868 requires no modifications to your Apple computer. Five key software programs are included: Memory Management System, utilities, diagnostics, demos, and RAM disk emulators for DOS 3.3, CP/M and Apple Pascal. Also features DOS relocator. Complete with instructions.

JE868 (Expand-A-RAM) . . . $119.95

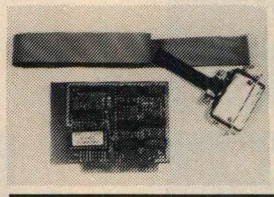
PROMETHEUS PRODUCTS · INC

Applesurance Diagnostic Disk Controller Card

The **JE877** serves as a diagnostic tool, an assurance/maintenance tool and a dual disk drive controller. The JE877 will verify and check the operating hardware of your system each time you turn on your Apple II, II+ or *IIe*.* Test your RAM, ROM, CPU, and disk drives. Diagnostic routines may be cancelled at the touch of a key. Complete with instructions.

JE877 (DRV-1/Applesurance II) . . . $69.95

PROMETHEUS PRODUCTS · INC

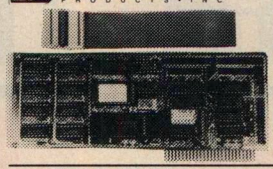


Parallel Printer Card

The **JE880** Printer Interface board is an intelligent interface to most of today's popular dot-matrix graphics printers. The JE880 is fully compatible with Apple CP/M, Apple Pascal (or FORTRAN), and most other operating systems and software packages available for Apple II, II+ and *IIe*.* The JE880 is shipped configured for the Centronics standard and can be re-configured for other standards if necessary. Advanced text printing features include: video screen echo ON or OFF, auto/disable linefeed after carriage return, set/clear the 8th bit of the output data, set left margin and more! Complete with instructions.

JE880 (PRT-1). $59.95

PROMETHEUS PRODUCTS · INC



Parallel/Serial Buffer Card

The **JE883** provides the user with up to 64K of additional or buffered memory (18 pgs. of information). Using the parallel jumper cable supplied, the JE883 will attach to the JE880 (above). Parallel Card needed for operation. The JE883 includes a standard parallel input with both parallel and serial (RS232) buffered outputs. With these features you may access and buffer information to two types of printers (one serial, one parallel) simultaneously. Complete with instructions.

JE883 (P/S Buffer). $79.95

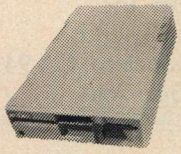
*APPLE, APPLE II, II+ and *IIe* are registered trademarks of Apple Computers.

APPLE™ Compatible 5¼" Disk Drive and Controller Card

• Belt-driven • 143K formatted storage • Color matches Apple Computer • Works with Apple Controller or other Apple-compatible controllers (JE875) • Complete with connector — just plug into your disk controller card • 35 tracks • Size: 6"W x 3½"H x 8-9/16"D • Weight: 4¼ lbs.

ADD-514 (Disk Drive) $139.95
JE875 (Controller Card) $49.95

APPLE™ Compatible 5¼" Half-Ht. Disk Drive



• Direct drive • 143K formatted • 35 tracks • Super quiet • Works with Apple Controllers or other compatibles (JE875) above • Complete with connector-just plug into your controller • Size: 5¾"W x 1⅝"H x 8"D • Weight: 4 lbs.

ADD-12. . . . $129.95

APPLE™ *IIc* Compatible 5¼" Half-Ht. Disk Drive

• Same specs as ADD-12 (above) except no controller necessary.

ADD-IIc. . . . $129.95

80-Col. plus 64K RAM for your APPLE *IIe**

Now you can double the memory capacity and get an 80-column display format for your APPLE *IIe** computer at an affordable price. Just plug the JE864 card into your APPLE* and expand your display to 80 characters per line. Perfect for word processing. The JE864 also features 64K bytes of additional memory to allow programming not possible with standard APPLE *IIe** computers. Complete documentation included.

JE864. . . . . $69.95

16K RAM Card** (Language Card)

The JE860 RAM Card allows the Apple* II and II+ computers to expand from 48K to 64K. Complete with instructions.

JE860. . . . . $39.95

APPLE Keyboard and Case for Apple II and II+

KEYBOARD (KB-A68):
• 68 Keys • 15-Key Keypad • Direct connection with 16-pin ribbon connector • Special features include automatic-key repeat, cursor control/numeric keypad, 46 predefined function keys (Applesoft™, DOS commands and CP/M™), 10 user-definable keys *and more!* • Color (keys): white/grey • Size: 14½"L x 5½"W x 1½"H

CASE (EAEC-1):
• Accommodates KB-A68 • Pop-up lid for easy access • Fits power supply *and* motherboard • Size: 15½"L x 18"D x 4¼"H

Part No.	Description	Price
KB-EA1	Apple Keyboard and Case.	$99.95
KB-A68	68-Key Apple Keyboard only.	$69.95
EAEC-1	Expanded Apple Enclosure Case only.	$34.95

$20.00 Min. Order - U.S. Funds Only
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for any RS232 Computer

PM1200 (Stand-Alone) $299.95

MAC PAC *for your Macintosh*

Includes: ProModem 1200 external modem, cable and ProCom-M software.

MAC PAC . . . $349.95

OPTIONS for PM1200/MAC PAC

PM-Special #2 Includes Comm. Buffer, 512K Memory and Display. **$249.95**

1200/300 Baud 212A
Telephone Modem for your Apple II, II+ & *IIe*. Just plug in — Hayes compatible!

PM1200A . . . $299.95

300 Baud for *IIc*
Attaches to the rear of Apple *IIc*. Built-in speaker.

PM300c. . . $149.95

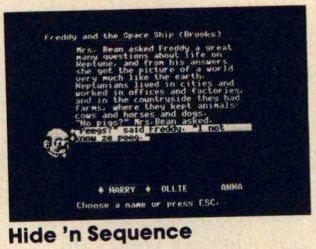
CIRCLE 279 ON READER SERVICE CARD

**When using CP/M, the JE860 and JE868 will only function with Versions 2.20 or earlier.

II SERIES

HIDE 'N SEQUENCE

In Hide 'n Sequence, a new language game from Sunburst Communications, students choose from a series of literary passages whose sentences have been scrambled. Their goal is to reassemble the passage so that their version matches the original. Most of the passages are excerpts from longer works, many by well-known authors, and they cover a wide subject area. The selections are divided into four styles: Narration, Exposition, Description, and Persuasion. Students can also use what they learn about organization and sequence in different



Hide 'n Sequence

kinds of writing to create their own stories. Packages are available for elementary, junior-high, and senior-high students. *(List Price: $69)*

Requires: Apple II Plus, IIe, or IIc; 48K RAM

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MAC

MAINSTAY SOFTWARE

Mainstay has released three new products for the Macintosh—TypeNow, a memory-typewriter desk accessory; Disk Ranger, an automatic catalog and label maker; and N'cryptor, a data-protection application.

TypeNow turns the Macintosh and ImageWriter into a memory typewriter. Its memory provides one line of buffer that you can view on-screen before printing it. You can also enter a second line while viewing the first line and select various typestyles and line spacing. Typing and positioning can be recorded for later playback.

Disk Ranger can catalog both disk volumes and files and can sort them either alphabetically or by type or creator. You can print or save a catalog to disk for later use. The product prints labels automatically on a strip of pin-feed labels. The package contains more than 50 labels; additional labels in a continuous-feed package are also available.

Finally, N'cryptor protects both sensitive files and applications through a password-based encryption. Written in assembly language, the software can protect files and applications in less than 30 seconds. *(List Price: TypeNow,*

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Agoura Hills, CA 91301
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MAC

CLR LIBRARIES

Clear Lake Research has released two easy-to-use machine-language programs, CLR ToolLib and CLR MathStatLib, that allow Macintosh users to take full advantage of the computer's power from BASIC.

ToolLib adds more than 100 statements that access Macintosh ROM. The Macintosh's Quickdraw feature contains a wide variety of graphics routines, and ToolLib provides access to more than 60 of them, as well as allowing users to manipulate Quickdraw's regions in various ways. It also adds more than 30 statements for using many types of Macintosh resources.

CLR MathStatLib contains more than 20 sorting utilities, matrix operations, and statistical functions. Statements are available to sort strings, integers, and single- and double-precision numbers in ascending or descending order. The library's matrix operations include addition, subtraction, multiplication, and transposition, as well as single statements that find the determinant and inverse of a matrix. MathStatLib's statistical functions can compute minimum, maximum, mean, and standard deviation and evaluate distributions. *(List Price: $35 each, $50 for both)*
Requires: Macintosh
Clear Lake Research
5353 Dora Street
Suite 7
Houston, TX 77005
(713) 525-4111
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MAC

MACSCHEME

MacScheme is a modern implementation of LISP that offers a fast interpreter and full run-time error detection and debugging. The program conforms to the standards for Scheme, a dialect of LISP, and supports Common LISP's most important features—lexically scoped variables, first-class procedures (closures), macros, and both floating-point and infinite-precision integer arithmetic. MacScheme features multiple scrolling windows, all of which can be edited. Its editor provides help with LISP syntax by highlighting matching parentheses and suggesting proper indentation. *(List Price: $125)*
Requires: Macintosh, 512K RAM
Semantic Microsystems
1001 Bridgeway
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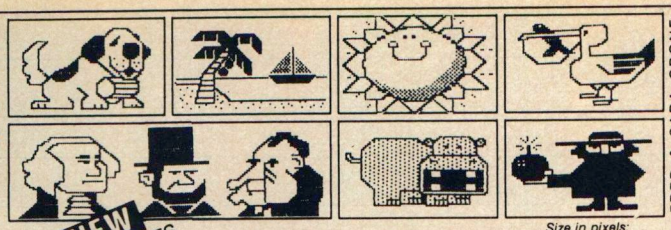

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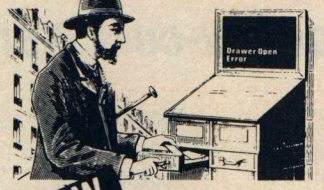

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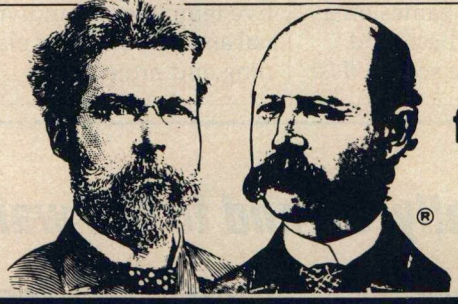

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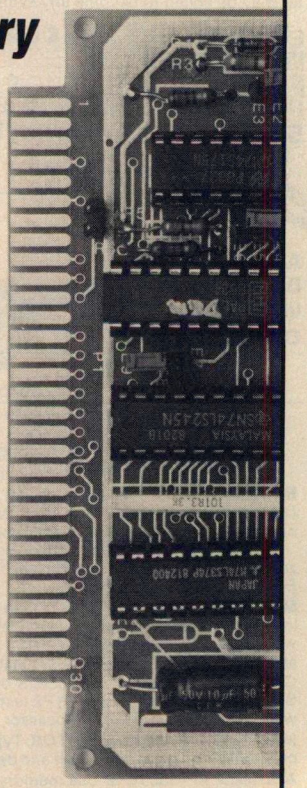

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EXPERTELLIGENCE SOFTWARE

ExperTelligence, developer of artificial-intelligence-related software products for the Macintosh, has announced enhanced versions of ExperLisp and ExperLogo, along with two new products—ExperOPS5 and ExperLogo-Talk.

The enhanced version of the LISP development environment ExperLisp—Version 1.04—includes a variety of extensions, such as the Parentheses-Matching Editor; a SETF; the sequentially bound control structures DO*, PROG*, and FACT*; general system enhancements; and new examples that allow users to create functions such as a DEFSTRUCT and a case-sensitive SEARCH for the ExperLisp editor.

ExperLogo, Version 1.1, provides an expanded set of features that include enhanced error checking, greater control of windows, user-definable menus, and improved performance. Registered owners of ExperLogo can obtain the updated version free.

The company's new product ExperOPS5 is an expert-systems building tool that works with ExperLisp. The product features a forward-chaining inference engine, coupled with a powerful pattern-matching algorithm. An interface provides users with complete access to ExperLisp.

Designed for use with ExperLogo, ExperLogo-Talk allows users to utilize the Macintosh's extensive sound capabilities to produce lifelike speech. For a limited time, ExperTelligence is including ExperLogo-Prolog, a Prolog interpreter written in ExperLogo, with ExperLogo-Talk. *(List Price: ExperLisp, $495; ExperLogo, $149.95; ExperOPS5, $325; ExperLogo-Talk, $49.95)*

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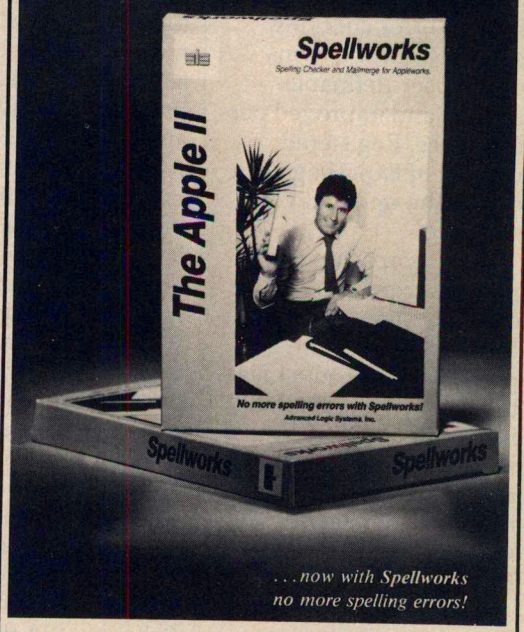

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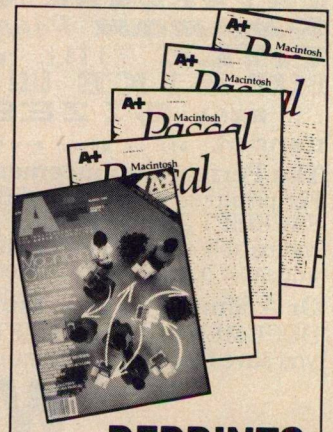

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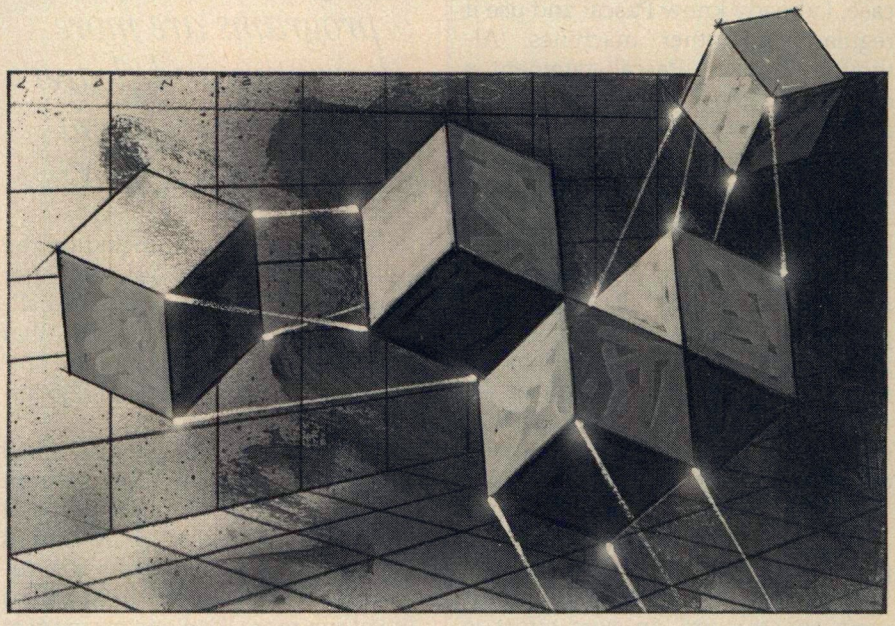
BY STEVE ROSENTHAL

MODULA-2 FOR MEGABYTE PROGRAMS

A better set of tools for large programming endeavors



Are programming languages more like fashions or scientific advances? If they're more like fashions, you can pick any one you like and stick with it—unless, of course, you have to apply for a new job where fashion happens to count.

If programming languages are more like scientific advances, though, each one is an attempt to build further on the accomplishments of the past. Science and programming both can have blind alleys and failed theories, but, in this view, each major new programming language represents a better set of tools. With better tools, you can at least work more efficiently and quite possibly build structures that were previously impossible.

I've been leaning toward the second view, and that's why I've begun learning Modula-2.

It's true that I can probably continue to get by with just my trusty BASIC and an occasional assembly-language hack with PEEK and POKE. Too much of my brain's limited capacity is already devoted to various mnemonics, keywords, and syntax. If I look at the mainframe world, most people are still busy writing programs in COBOL and FORTRAN, even though both languages are several generations back in programming evolution.

Yet if I consider either the evolving Apple II or the Macintosh, I can see that the huge memory spaces, more complex processors, and increasingly sophisticated operating systems are more than a match for what I can do with BASIC. So, although true hackers may not need to learn another language (they can do it all in assembly language or worse), I believe those of us who program with only partial dedication will need to take the plunge.

Modula-2 is my top candidate for a new language right now, for five main reasons. First and most important, it's available—you can already get a Modula-2 compiler for either the Mac or the Apple II, as well as for that other popular personal computer. On the Apple II, Volition Systems of Del Mar, California, produced a Modula-2 compiler, but the firm was beset by internal troubles during 1985. The compiler still works, but another firm may be marketing it by the time you read this. The compiler is based on the Apple UCSD Pascal System, which you need in order to run Volition's Modula-2.

Are programming languages more like fashions or scientific advances?

For the Macintosh, you can find the ETH Modula-2 compiler on many bulletin boards, or you can buy Mac-Modula-2 from Modula Corporation (Provo, Utah). The bulletin-board version has spotty documentation, odd bits of which remain in the original German. Modula Corporation's product comes with a complete manual, hooks to more than 400 of the Mac toolbox routines, and has examples of all sorts of useful information about how to make Modula-2 work on the Mac.

Compared to the number of implementations and the depth of support for BASIC, the Modula-2 offerings are still rather thin, but I think that situation's going to change as compiler writers recognize the possibilities of a super Apple II and an expanded

WILLIAM CONE

Mac. The rumor mill has it that several other Modula-2s are currently in the works.

The second big advantage of Modula-2, I believe, is that it builds on Pascal. Like Pascal, Modula-2 was designed and written by Dr. Niklaus Wirth and associates at Switzerland's Institut für Informatik, at the Eidgenössische Technische Hochschule (ETH) in Zürich. Pascal has been an important development language at Apple for quite a while, and much of Apple's system software has a Pascal flavor.

As an added benefit in my own case, I already know Pascal and use it regularly on other machines. Although not every Pascal statement is legal in Modula-2 and the differences are more significant than an occasional extension to the language here and there, the essential structure, tone, and grammar of Modula-2 are Pascal-like.

The third Modula-2 advantage is program readability. Just like Pascal programs, Modula-2 programs are more descriptive and clearer than an equivalent program in BASIC or assembly language. Therefore, the Modula-2 programs are easier to read and understand, which simplifies code maintenance and sharing.

Considering that with many programs, updates and maintenance take far more time than the original program construction, an extra effort to make programs more understandable usually pays off. Particularly in business and institutions where the people who maintain software may not be the people who write it, any help that the language can provide is invaluable.

Fourth, as its name implies, Modula-2 is modular. Rather than making you write and compile programs in one large chunk, Modula-2 encourages you to split your program into manageable sections. Some Pascals (notably UCSD Pascal, including the Apple implementations) already offer a way to build programs out of smaller units, but Modula-2 includes that facility as an inherent part of the language, with better support and greater portability.

Just like Pascal programs, Modula-2 programs are more descriptive and clearer than an equivalent program in BASIC.

And, fifth, Modula-2 was designed for multiprogramming, the apparent running of two or more programs at once. Although neither of the current Mac operating systems nor the rumored Mac and Apple II upgrades can yet run more than one program at a time, I'm almost sure that we'll see multiprocessing systems for both computers in the next year or two. If I'm going to learn a new language, it ought to be one that will support multiprocessing.

Right now, though, if you want to do multiprogramming in Modula, you'll have to have an Apple II, rather than a Mac. Neither of the Mac Modulas supports interrupts, at least in the versions available at this writing. The Volition compiler does support interrupt-checking and processing on the Apple II, which lets the system respond to hardware signals from a clock or the outside world. That's fairly heavy hacker territory, though, and I'm waiting for easier tools or more Modula-2 experience before I try to use those features.

The Drawbacks

Before we go any further with Modula-2, though, let me point out an important *dis*advantage: All the Modula-2 implementations for the Apple II or Macintosh that I know about are compilers (meaning that you have to write a complete program before you can check it out) rather than interpreters (with which you check out each line as you finish it up). The ideal would be an interpreter for development, followed by a compiler for making a quick-running version of the program when you have it the way you like it.

Even worse, the present Modula-2 compilers' output is "M-code" for a theoretical Modula computer, rather than the actual machine instructions that 6502- and 68000-based comput-

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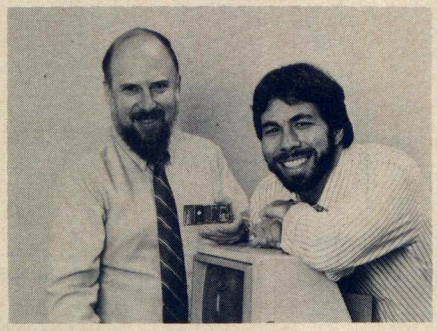

SwyftCard creator Jef Raskin and Apple II creator Steve Wozniak

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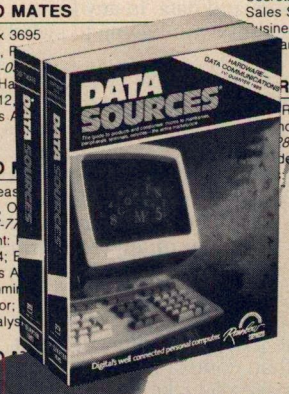

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ers need. This type of output makes writing the compiler easier (especially in customizing an overall design for different types of computers) and cuts down on the space you need to store programs. On the other hand, it slows program execution and means that you have to use the compiler's Modula-2 run-time package to execute your program.

Furthermore, to create a Modula-2 program, you have to use an editor to create the source code, the compiler to translate it to M-code form, the linker to add in any library routines, and the run-time package to execute it. The size of these provided support programs tends to be a problem on floppy-disk-only machines that have limited disk capacity, particularly single-drive machines and older Apples that use Disk II storage.

So, for quick little programs, Modula-2 is no challenge to the normal interpreted BASIC. And no programming language, I believe, will begin to displace BASIC from its premier role in desktop computing until it makes turning out those quick little projects just as easy or easier. Modula-2, with its modular structure, is better for big projects, though.

Modula at Work

Modula-2 is actually modular in two major ways. Like Pascal, Modula-2 lets you write programs as series of procedures, allowing you to separate logical functions into blocks that you can reuse and rearrange. Modula-2 goes even further and lets each program "import" and "export" values and procedures, allowing you to build up "libraries" that provide services to "clients."

In case you're not a Pascal programmer and that description seems a little abstract, here's the archetypal simple demonstration program in Modula-2, which simply prints out *Hello* on the screen:

```
MODULE aplus
FROM InOut IMPORT
  WritesString, WriteLn;

PROCEDURE printhello;
BEGIN
  WriteString ( "Hello");

  WriteLn;
END printhello;

BEGIN (* Main Program *)
  printhello;
END aplus.
```

As you can see, the overall structure of our program is a module, with a declaration part and an implementation part.

The declaration says we want to import two routines from the standard input/output library module (which is customized for each machine type that Modula-2 works on). In Modula-2, all I/O is through library routines, rather than by predefined statements in the language.

The implementation part of the program has a single procedure that does the detailed work and a main program segment that invokes that procedure. A more useful program might have dozens of procedures and a more complex flow of control in the main program. As in Pascal, however, burying the details of execution in procedures helps keep the main program flow clear and uncluttered and lets us make changes in the way details are handled, without affecting overall program operation.

In this example, adding more levels to the program is simple enough.

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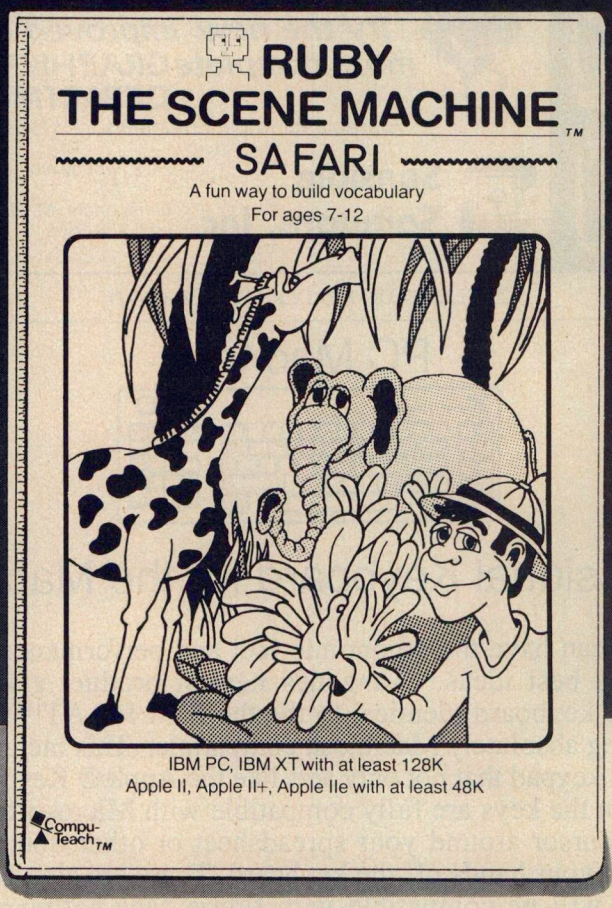

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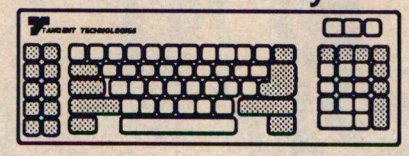

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Either we can add procedures as part of this module, or we can define other library modules with a set of stock routines. Just as we imported procedures in this example, we can export procedures for other modules to use.

Using the separate compilation facility within Modula, you can build up your own libraries, or you can swap modules with other people's (I imagine you'll soon also be able to buy them). Modula's emphasis on libraries encourages you to reuse previously developed and debugged code, rather than reinventing the solution each time.

By the way, Modula, like Pascal, is a strong type-checking language, which means that it won't let you assign a real number (one with a decimal point) to an integer variable or a string to a number—you'll need a little while to get used to the restrictiveness of the approach if you normally program in C or assembly language, but most people feel it's worthwhile because it helps spot errors in logic and coding.

Modula's emphasis on libraries encourages you to reuse previously developed and debugged code.

Modula-2 has a few other problematic features. In this language, uppercase and lowercase are significant—Modula considers thisWORD and THISword to be completely different (in Pascal they are equivalent). I consider this distinction a step back toward the mainframe era.

Modula-2, like Pascal, fails to deal well with strings. I understand Wirth's desire to keep the purity of data types, but I think you should be able to pass a character to a function or procedure that is expecting a string. Most versions of Pascal let you do that, and in BASIC a character is just a one-item-long string.

Octal, the base-8 numbering system, is still the basis for character functions in Modula-2. You can assign a value to a character variable or constant with an octal number followed by the letter C, yet in the microcomputer world, the ASCII tables that give the numerical code values of characters are all either in decimal or

hexadecimal (base 16). And for reasons that may make sense to speakers of Swiss-German, a B suffix after a number in Modula-2 means octal and not binary.

The Apple II and Macintosh implementations are a bit clunky. The MacModula-2 compiler, for example, takes four passes to translate a program, and the Volition system on the Apple II uses the UCSD operating system instead of DOS or ProDOS. None of the compilers is likely to win a speed award.

If Modula-2 catches on, we'll see expanded compilers that produce code specifically for their microprocessors.

But it's still early yet. If Modula-2 does catch on, we'll see expanded compilers that produce code specifically for their microprocessor, which will make running the code faster and easier. We should also see an expanding set of programming tools. With hard-disk prices for both the Apple II and the Mac still falling, the bloated size of the compiler systems won't matter that much.

I'm hoping that will happen. I can't see writing a megabyte program in BASIC. Though I like programming, I'll take all the help I can get. ✚

Consulting Editor Steve Rosenthal's regular program includes compiling this column and other articles for A+. He got help in locating Modula material from Disk Karpinski of the Modula-2 Users Association.

PRODUCT INFORMATION

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THE ProDOS DA INSTRUCTION

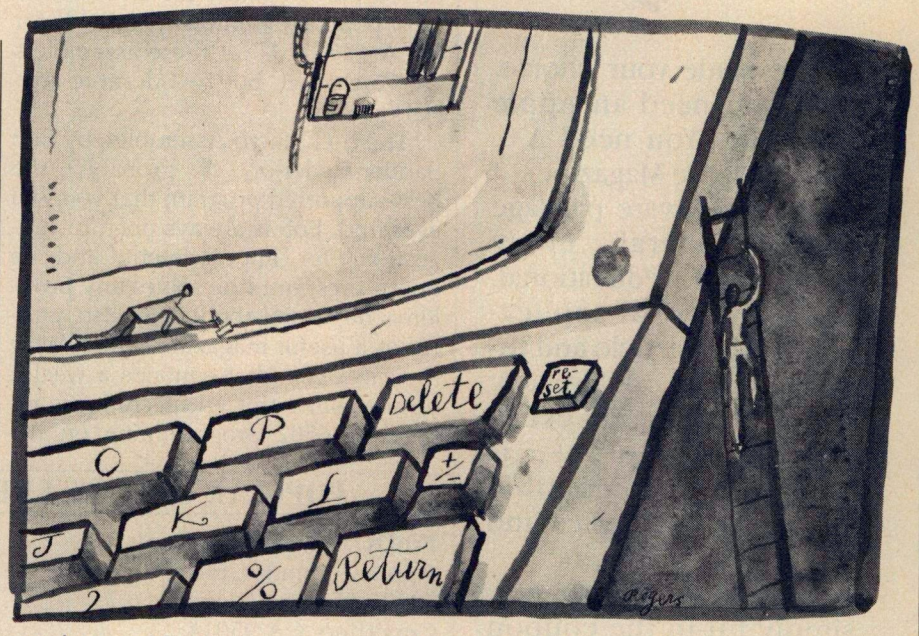
Q. *In the assembler listing for the DUMP# program in your "Understanding ProDOS" article in the July issue of A+, you use the DA instruction on line #164. My Apple ProDOS Assembler does not recognize this instruction, so I can't assemble the program. What does the DA instruction do?*

A. The DA instruction is not a real 6502 instruction at all. Rather, it is a pseudoinstruction (or "pseudo op") that directs the assembler (Merlin Pro, in this case) to store the two-byte value of the operand in the object code, low-order byte first. DA is a mnemonic for Define Address and is equivalent to Merlin's DW (Define Word) pseudo op. The Apple assembler you're using utilizes only the DW pseudo op, so use it instead.

There are several other important pseudo ops that you'll often encounter. Unfortunately, in the absence of standards, their mnemonics generally vary from assembler to assembler. Here are some of the Merlin pseudo ops that you'll see quite often (refer to the manual for your assembler to determine the equivalent pseudo ops):

- DFB or DB ("Define Byte") puts the byte specified by the operand into the object code.
- DS ("Define Storage") stores the number of bytes specified by the operand into the object code.
- ASC ("ASCII") stores the ASCII codes for the string specified in the operand into the object code.
- ORG ("Origin") instructs the assembler to start assembling the code beginning at the address specified in the operand.

Before we leave this topic, here's a warning about the way you specify the high-order or low-order byte of a two-byte address as an immediate quantity. With Merlin, you use an operand of the form #<ADDRESS to identify the low-order byte and #>ADDRESS to identify the high-order byte, where ADDRESS is the address being examined. The Apple ProDOS Assembler Tools assembler uses exactly the reverse scheme! Be careful.



When I try communicating at 1200 bps, all I get is trouble.

DATA LOSS AT 1200 BPS

Q. *When I use my modem to communicate at 300 bps with CompuServe or Delphi, everything works well. When I try communicating at 1200 bps, however, all I get is trouble. Specifically, I seem to be missing three to six characters at the beginning of every line, but only when the screen is scrolling—when the cursor is near the top of the screen, everything seems fine. How can I solve this problem?*

A. Your problem arises because the Apple IIe's standard 80-column-screen-scrolling subroutine is so slow that several characters may arrive at your modem before your communications software has had a chance to check for input. The inevitable result is data loss.

There are two possible solutions to your problem. First, you can use a communications program such as ASCII Express (United Software Industries, 1880 Century Park East, Century Park, CA 90067; [213] 556-2211) that configures your modem interface in such a way that a 6502 interrupt occurs whenever the modem receives a character. This configuration lets the program grab characters and save them, even though a scrolling operation may be in progress.

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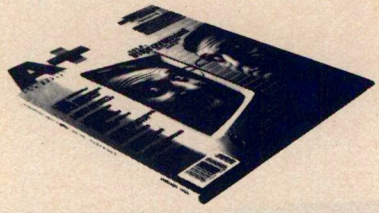

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For modem interfaces that don't utilize interrupts, use a program with a custom scrolling subroutine that polls for modem input during the scrolling operation. One program that uses this technique is my own Modem Magician, available for $40 from A.P.P.L.E. Co-op, 290 S.W. 43rd, Renton, WA 98055; (206) 251-5222.

ASSEMBLY-LANGUAGE PROGRAMMING

Q. *I've recently decided to teach myself 6502 assembly-language programming. Can you recommend a good assembler?*

A. See "Popular 6502 Assemblers for the Apple II" below for a list of the most popular assemblers available for the Apple II. All of these assemblers are very good, but two deserve special mention.

The S-C Macro Assembler, by Bob Sander-Cederlof, is probably the best-supported program that you will ever find. Bob is always open to suggestions for improvement, and he doesn't rest until he solves any problems he hears about. He also publishes a useful magazine called *Apple Assembly Line* that contains a wealth of interesting tips and techniques related to 6502 programming on the Apple II. Each issue contains several program listings in the S-C Assembler format.

One of the best assembler values has to be Glen Bredon's Merlin Pro. For $99.95, you get both a ProDOS and a DOS 3.3 version of the assembler; the Sourceror program, which helps you convert machine language to Merlin source code; and a commented source listing of the Applesoft ROMs. Several sample programs on the Merlin disks help explain some of the advanced features of the assembler. For those with an eye to the future, Merlin also supports 65C02, 65802, and most 65816 instructions. (See "Apple Machine Language, Part I," *A+*, December 1985, pages 95–107, and Part II in this issue, pages 85–90.)

The S-C Macro Assembler is probably the best-supported program that you will ever find.

POPULAR 6502 ASSEMBLERS FOR THE APPLE II

ProDOS Assembler Tools
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
List Price: Version 1.0 (ProDOS), $50

ORCA/M
The Byte Works, Inc.
8000 Wagon Mound Drive N.W.
Albuquerque, NM 87120
(505) 898-8183
List Price: Version 3.5 (DOS 3.3), $99.95; Version 4.0 (ProDOS), $79.95

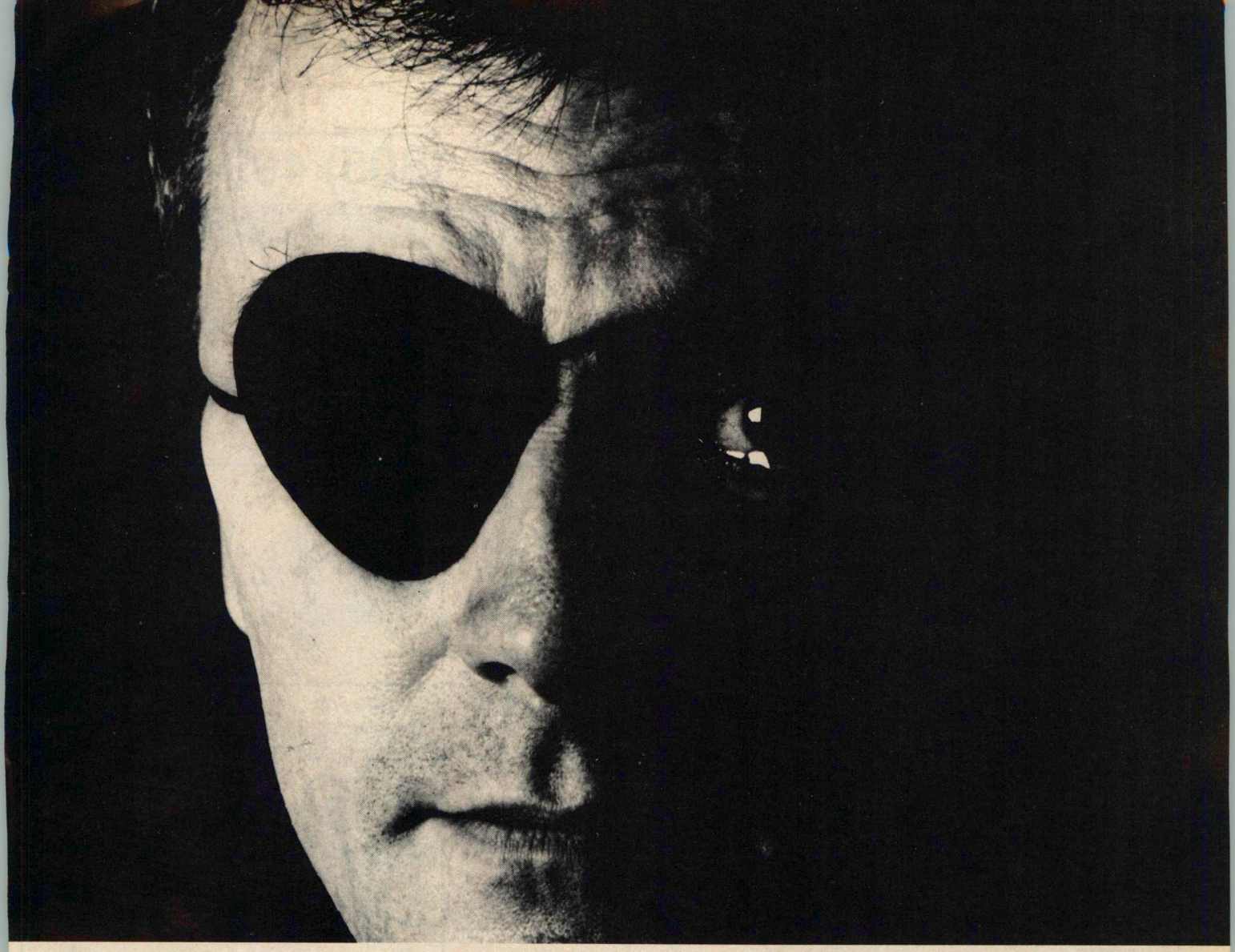
LISA
Lazerware, Inc.
2271 Indian Horse Road
Norco, CA 91760
(714) 735-1041
List Price: Version 3.0 (DOS 3.3) and Version 3.1 (ProDOS), $79.95 each

The Assembler
MicroSPARC, Inc.
45 Winthrop Street
Concord, MA 01742
(617) 371-1660
List Price: DOS 3.3 and ProDOS versions, $49.95 each

Merlin and **Merlin Pro**
Roger Wagner Publishing, Inc.
10761 Woodside Avenue—Suite E
Santee, CA 92071
(619) 562-3670
List Price: Merlin (for II Plus, IIe, or IIc; DOS 3.3), $64.95; Merlin Pro (for IIc or 128K IIe; DOS 3.3 and ProDOS), $99.95

S-C Macro Assembler
S-C Software Corporation
P.O. Box 280300
Dallas, TX 75228
(214) 324-2050
List Price: Version 2.0 (DOS 3.3), $100; Version 2.0 (ProDOS), $100; DOS 3.3 and ProDOS, $120

LADS Assembler
Included in *Apple Machine Language for Beginners* by Richard Mansfield, COMPUTE! Publications, 1985, $14.95. Available separately on disk from COMPUTE! Publications, P.O. Box 5058, Greensboro, NC 27403, for $12.95.



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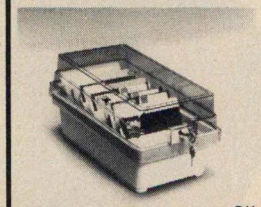

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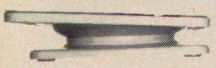

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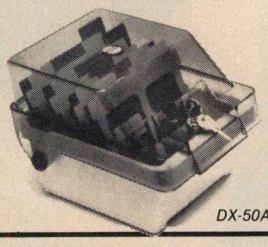

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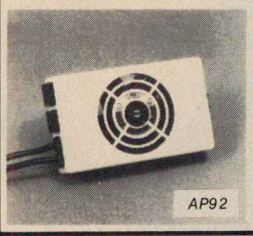

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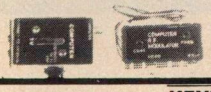

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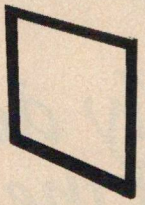

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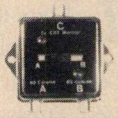

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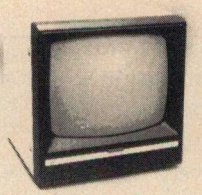

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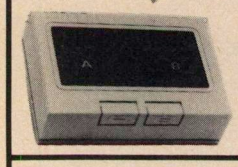

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A. The 10K Applesoft ROM in every Apple II computer contains several assembly-language subroutines that execute the nine Applesoft high-resolution-graphics commands: HGR, HGR2, HCOLOR=, HPLOT, DRAW, XDRAW, SHLOAD, ROT=, and SCALE= The most useful of these subroutines are described below.

You can call any of the high-resolution subroutines directly from your own assembly-language programs by using the JSR (jump to subroutine) instruction. Before doing so, make sure that the 6502 registers contain the values the subroutine expects.

Note that the Applesoft ROM does not contain any subroutines that provide the double-width (double-high-resolution) graphics modes that are available on the IIe and IIc. For tips on how to write such subroutines, refer to Allen Watson III's article "True Sixteen-Color Hi-Res," in the January 1984 issue of *Apple Orchard.* ✚

Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002.

THE APPLESOFT HIGH-RES GRAPHICS SUBROUTINES

Symbolic Name	Address (hex)	Description
HGR2	$F3D8	Displays the high-resolution, full-screen, page 2 graphics screen and clears it to black.
HGR	$F3E2	Displays the high-resolution, mixed-mode (four lines of text at bottom), page 1 graphics screen and clears it to black.
HPLOT	$F457	Plots a dot at the position stored in the accumulator (vertical position), the y register (horizontal position/256), and the x register (horizontal position modulo 256), but only if the selected color is permitted for the specified horizontal coordinate. Green and orange dots are permitted in odd columns only; violet and blue dots are permitted in even columns only.
HLIN	$F53A	Draws a line from the last plotted dot to the position stored in the y register (vertical position), x register (horizontal position/256), and the accumulator (horizontal position modulo 256).
DRAW	$F601	Draws the shape whose data area is pointed to by the y register (high byte) and the x register (low byte), using the rotation factor in the accumulator. It draws the shape by inverting the existing screen bits that the shape uses.
XDRAW	$F65D	Same as DRAW, except that when the shape is plotted, the existing screen bits and the shape bits are logically "exclusive-0Red" with each other to determine the new value of the screen bit.
SETHCOL	$F6EC	Sets the active color to the value in the x register (0...7). These are the eight colors defined by the Applesoft HCOLOR= command: black1, green, violet, white1, black2, orange, blue, and white2.

Notes:
1. The value stored in HPAG ($E6) determines which of the two graphics screens will be used for drawing. Store $20 in HPAG for page 1 and $40 for page 2.
2. Horizontal coordinates run from 0 (left) to 279 (right).
3. Vertical coordinates run from 0 (top) to 191 (bottom).

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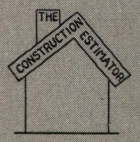

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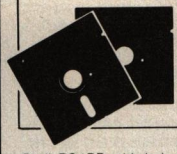

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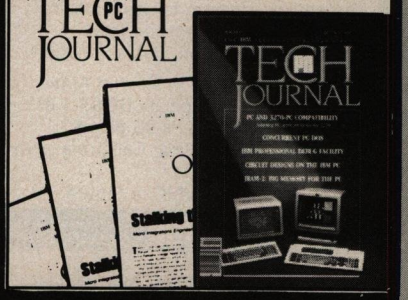

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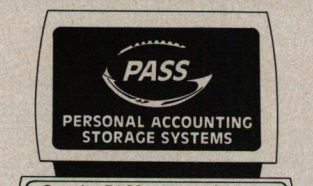

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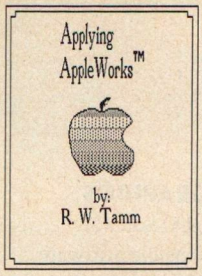

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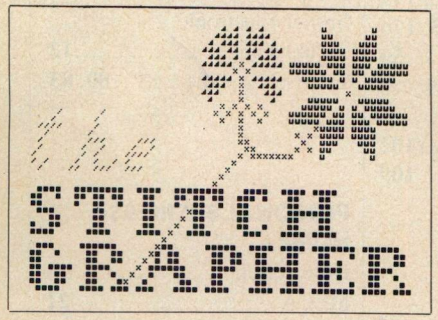

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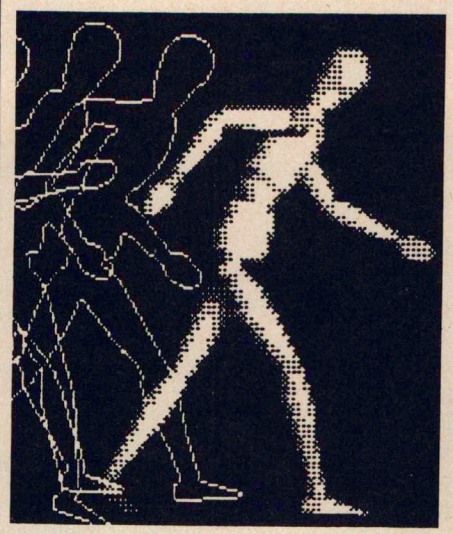

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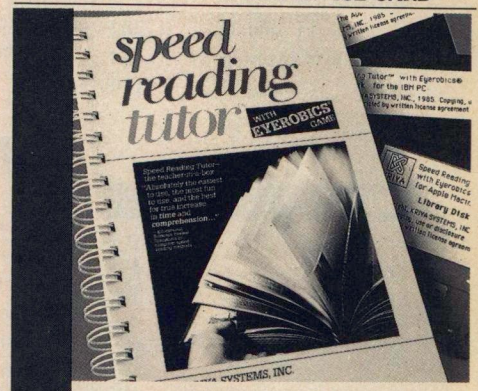

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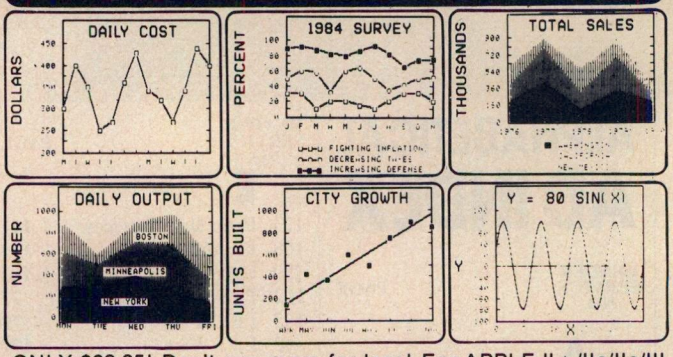

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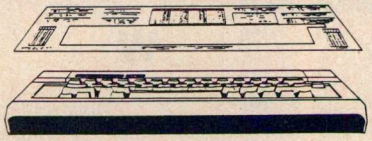

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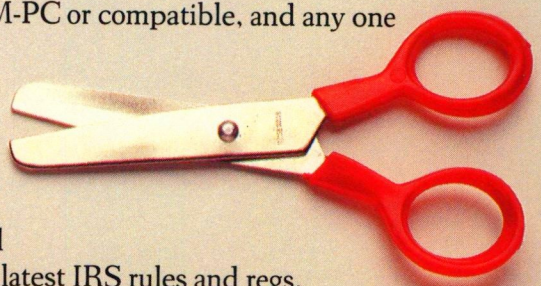

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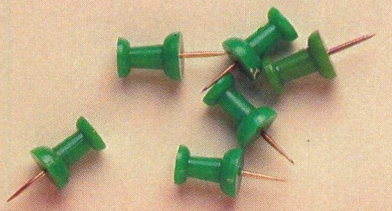

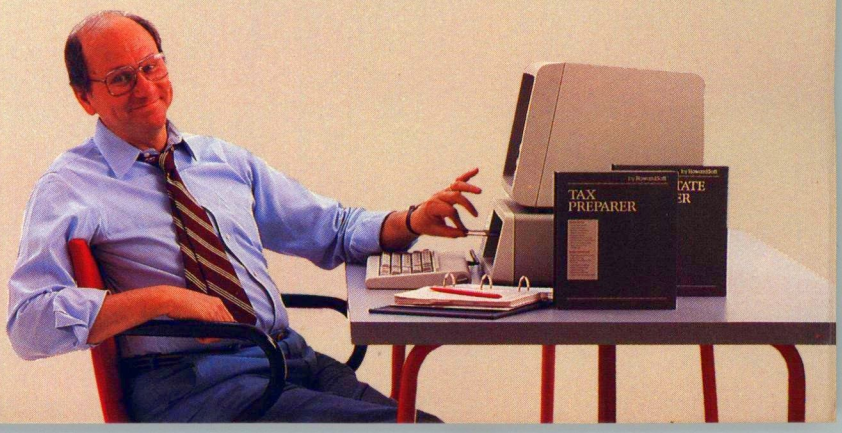

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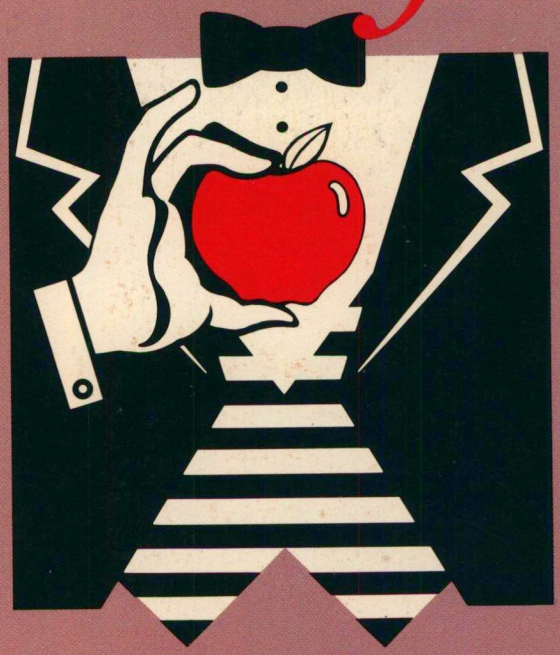

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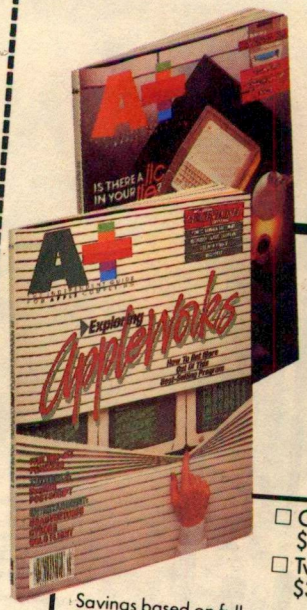

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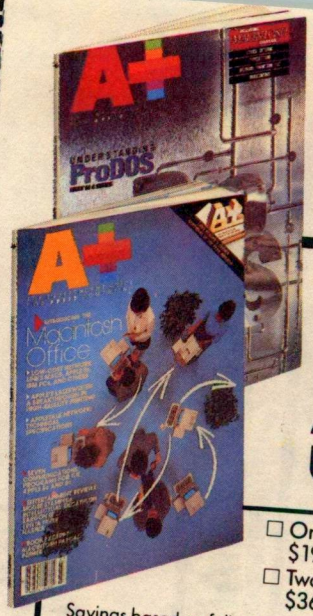

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